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INTERIM MEASURES REMEDIATION WORK PLAN FOR SOLID WASTE MANAGEMENT  
UNIT 2 PCB AREA NS MAYPORT FL  
6/1/1995  
BECHTEL ENVIRONMENTAL

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INTERIM REMEDIATION WORK PLAN  
FOR  
SWMU 2 PCB AREA  
U.S. NAVAL STATION MAYPORT  
MAYPORT, FLORIDA

Prepared for

DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND

Under Contract No. N62467-93-D-0936

Prepared by

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REVISION 1


Bechtel Job No. 22567

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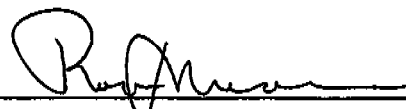
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## DISCLAIMER

This Interim Remediation Work Plan was prepared using background information, design basis, and other data furnished to BEI by the Naval Facilities Engineering Command, the Navy's CLEAN contractor, and/or third parties. BEI has relied on this information as furnished and is not responsible for and has not confirmed the accuracy of this information. Certain key assumptions made by BEI may substantially affect the conclusions and/or recommendations which are conditioned upon these assumptions. These assumptions, although thought to be reasonable and appropriate, may not prove true in the future.

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The engineering work described and professional opinions rendered in this document, *Interim Remediation Work Plan for SWMU 2, PCB Area*, Revision 1, dated June 1995, for work at the United States Naval Air Station Mayport, Mayport, Florida, were conducted or delivered using commonly accepted engineering practices and standards. The scope of engineering services described in this document was conducted under the supervision of a professional engineer registered in the State of Florida.

In accordance with Florida Administrative Code 61G15, Chapter 30, Section 30.003, please note that certain elements of the project depicted in this Work Plan are derived from information developed by others and are included solely for informational purposes or for clarity. Such information and elements are so noted with the source stated and neither BEI nor the below-signed engineer accepts responsibility for these elements.



6/28/95

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Expires February 28, 1997



**Bechtel Environmental, Inc.**

## FOREWORD

This Interim Remediation Work Plan (IRWP) has been prepared to document the scoping and planning process performed by the U.S. Navy to support remedial action activities at SWMU 2 PCB Area, located at Mayport Naval Station (NAVSTA) in Mayport, Florida.

Remediation is currently being performed in accordance with the Interim Measures Work Plan for Solid Waste Management Unit 2, Polychlorinated Biphenyl (PCB) Area for U.S. Mayport NAVSTA (May 1994).

Remedial action is necessary in selected areas of contamination for the protection of human health and the environment. This IRWP describes the approach that will be used to conduct the remedial action and describes the organization that will be employed.

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## 1.0 INTRODUCTION

The U.S. Department of Navy, Southern Division, Naval Facilities Engineering Command intends to conduct remedial actions at the Naval Air Station (NAVSTA), Mayport, Florida. This work plan addresses The Solid Waste Management Unit (SWMU) 2 Polychlorinated Biphenyl (PCB) Area, identified for remediation (See Figures 1-1 and 1-2, Appendix A). Bechtel Environmental, Inc. (BEI), the Environmental Response Action Contractor, will perform the remedial action at the SWMU 2 PCB Area.

This IRWP is intended to document the scope of the remediation effort and the procedures to be used.

The activities described in this plan are based on the following:

- observations made during a site visit by BEI and Navy personnel to NAVSTA, Mayport on July 20 and 21, 1994;
- discussion and conclusions from a meeting held between BEI, ABB Environmental Services, Inc. (ABB), and Navy personnel at NAVSTA, Mayport on July 20 and 21, 1994; and
- information contained in the Draft Interim Measures Work Plan for Solid Waste Management Unit 2 Polychlorinated Biphenyl (PCB) Area, prepared by ABB-ES, May 1994.
- information contained in the RCRA Facility Investigation (RFI) Work Plan, Volume II, Sampling and Analysis Plan, U.S. Naval Air Station, Mayport, Florida, prepared by ABB-ES, October 1991.

In implementing this plan, BEI will supply qualified personnel and equipment to the project; coordinate, manage, and supervise construction activities onsite; ensure compliance with contract and regulatory requirements; and lastly, provide documentation to the Navy that will include a data summary. BEI's approach to complete these tasks is presented in the following sections of this plan.

The remainder of Section 1.0 provides general site information and the justification and objectives for the proposed remediation.

Section 2.0 presents the BEI organization and responsibilities for completing the work.

Section 3.0 provides a site history and a detailed description of the site.

Section 4.0 provides the scope of work, the approach BEI will take to achieve the remedial objectives, and a description of the remedial action components and field activities.

Section 5.0 presents BEI's sampling and analysis plan and includes details on the surveys and remediation activities planned.

Sections 6.0, 7.0, and 8.0 address the Waste Management Plan, Safety and Health Plan, and Quality Control Plan, respectively.

## **1.1 GENERAL SITE INFORMATION**

NAVSTA Mayport is located about 15 miles east-northeast of downtown Jacksonville, Florida (see Figure 1-1, Appendix A). NAVSTA Mayport was established in 1942 on approximately 700 acres of land, and is primarily involved in intermediate level maintenance of equipment, ships, aircraft, and other support units assigned to that part of the Second Fleet, which is stationed at the facility.

## **1.2 JUSTIFICATION AND OBJECTIVES FOR THE PROPOSED ACTION**

The primary threat to human health and the environment associated with the SWMU 2 PCB Area is related to the potential for spreading of PCB-contaminated soil to surrounding areas. Therefore, the cleanup of uncontained materials is necessary for the longterm protection of human health and the environment.

# **2.0 ORGANIZATION AND RESPONSIBILITIES**

## **2.1 PROJECT ORGANIZATION**

BEI is the Environmental Response Action Contractor for the Navy, Southern Division Naval Facilities Engineering Command. BEI will subcontract for necessary laboratory support and analyses required for U.S. Naval Station Mayport. A project organization chart is provided in Figure 2-1.

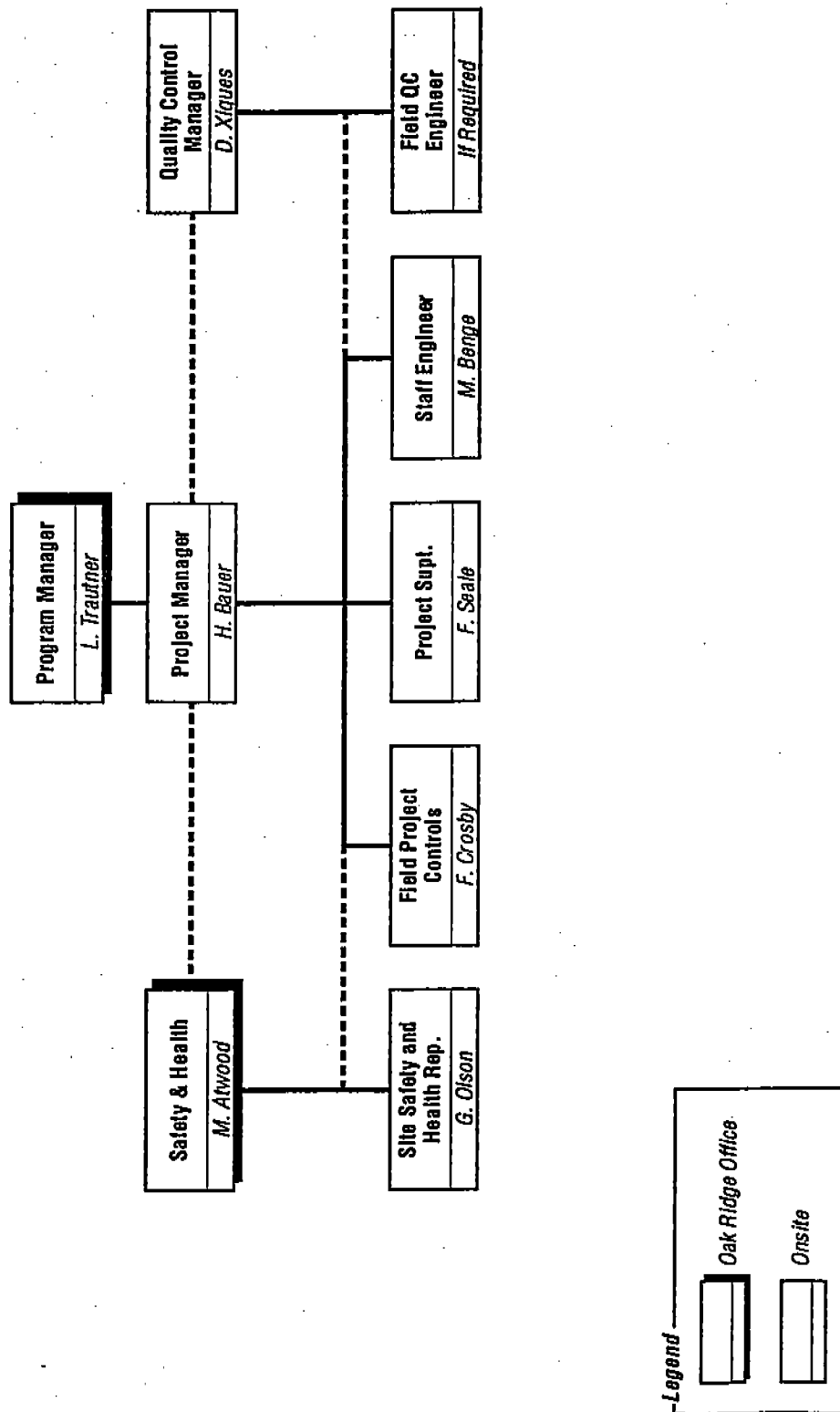
## **2.2 COORDINATION AND RESPONSIBILITIES FOR FIELD WORK**

As the Environmental Response Action Contractor for the Navy, BEI provides support to the NAVSTA, Mayport, and management of remedial action field activities, which includes all activities necessary to implement field work delineated in work plans. Typically, these activities include development and procurement of subcontract services; development, implementation, and overview of plans; collection and review of data, including sampling results, quality assurance/quality control submittals, and sample tracking and custody; technical guidance to onsite personnel; report preparation; cost management; and schedule control.

The BEI program manager is responsible to the Navy for the completion of all aspects of the work. The program manager is supported by a project manager and representatives from engineering, construction, environmental safety and health, contract administration, quality control, project administration, and project controls. A brief description of the responsibilities of the project manager and each group are described below.

### **2.2.1 Project Manager**

- Implements overall guidance provided by the BEI program manager on a site-specific basis



**Figure 2-1**  
**Project Organization**

- Manages a team of professionals from each of the disciplines described below to accomplish the goals of the Naval Facilities Engineering Command project managers and the BEI program manager
- Interfaces directly with Navy project managers to implement directions on a site-specific basis

#### **2.2.2 Engineering**

- Develops bid packages and technical specifications needed to subcontract any remedial action work
- Provides site interface/coordination with regulatory agencies
- Modifies technical specifications and drawings, as required
- Provides geotechnical field support to remedial action efforts
- Provides onsite waste management and identification
- Participates in technology selection
- Develops work plans for remedial action
- Manages and evaluates chemical data obtained during remedial action activities

#### **2.2.3 Construction**

- Reviews all site plans for constructibility
- Provides field engineering services to monitor onsite work
- Administers subcontracts to complete work plans (i.e., cost, completion)
- Obtains manual craft
- Directs craft to implement work plans
- The project superintendent is responsible to the BEI project manager for day-to-day operations at the site.

#### **2.2.4 Environmental Safety and Health**

- Develops plans, objectives, evaluations, and documentation for all environmental compliance, safety, and health matters
- Ensures all applicable federal, state, and local regulatory requirements are met

- Supports onsite waste management
- Provides site-specific safety and health training
- Provides a site safety and health representative (SSHR)
- Performs audits of site activities to ensure implementation of the Safety and Health Plan and to assess the effectiveness of the program.

#### **2.2.5 Contract Administration**

- Identifies bidders for subcontract work
- Coordinates bid and subcontract bid and award process
- Manages revisions to subcontracts
- Ensures compliance with Prime Contract

#### **2.2.6 Quality Control**

- Prepares site-specific quality control (QC) plan
- Implements the QC plan
- Audits quality assurance system and performance
- Conducts periodic reviews of program plans

#### **2.2.7 Project Controls**

- Provides cost and schedule support, including budgeting and monitoring
- Provides site automation services

#### **2.2.8 Project Administration**

- Provides administrative services such as document control, reproduction, archival, and mail distribution
- Provides document editing services

### 3.0 SITE BACKGROUND AND SETTING

#### 3.1 GENERAL SITE DESCRIPTION

NAVSTA Mayport is located about 15 miles east-northeast of downtown Jacksonville, Florida. NAVSTA Mayport was established in 1942 on approximately 700 acres of land, and is primarily involved in intermediate level maintenance of equipment, ships, aircraft, and other support units assigned to that part of the Second Fleet, which is stationed at the facility.

The PCB area is located downgradient, north and directly adjacent to SWMU 2 Landfill B (Figure 1-3, Appendix A). Contamination was discovered in the soil at the PCB area from a past site investigation conducted in 1988 (See Section 3.2). At the present, the PCB Area contains a group of pines and cabbage palms and is moderately vegetated with wild grass. Land use near SWMU 2 is presently industrial and includes explosive ordnance storage and aircraft maintenance.

#### 3.2 SITE HISTORY

The Polychlorinated Biphenyl (PCB) Area was discovered during Expanded Site Investigation (ESI) activities at SWMU 2 Landfill B in 1988 while installing monitoring wells MW2-9D, MPT-2-9S, and MPT-2-9D. The PCB Aroclor-1260 was detected at a concentration of 2,576 mg/kg in the soil sample taken from MPT-2-9D at the 0-2 ft depth. Although the source of the PCB contamination is not known, it was speculated to be surface spillage from transformers once stored on the Landfill B area.

During Phase I and II RFI activities, surface soil samples (0-12 in.) (Figure 2-1, Appendix A) were collected in a grid fashion. Analytical results from these sampling events were used to define the horizontal extent of PCB contamination in soil.

#### 3.3 CONTAMINATION CONDITIONS AT SWMU 2 PCB AREA

As mentioned previously, polychlorinated biphenyl (PCB) Aroclor-1260 was detected at a concentration of 2,576 mg/kg in a soil sample taken from 0-2 ft at MPT-2-9D. Findings from surface soil contamination characterization indicates PCB contamination appears to be confined to the upper 6 in. of the soil with higher concentrations near the surface. Additionally, PCB isopleths constructed from field sampling analytical results (Figure 2-2, Appendix A) show the highest PCB concentrations (ranging from 5 to 1,700 ppm, Appendix H) falling within a 90 ft by 60 ft area. Previous sample screening indicates most of the contamination is in the center of the sampling grid and near the wooded area with some isolated areas occurring at the edge of the grid boundaries.

### 4.0 SCOPE OF WORK

The remedial action objectives at the SWMU 2 PCB Area are to remove PCB-contaminated soil from the area and verify attainment of cleanup criteria through screening and laboratory analyses. Soil containing PCB contamination greater than 1 ppm will be excavated, transported and disposed at a certified TSCA chemical landfill or other approved facility. Two existing

monitoring wells, MPT-2-9S and MPT-2-9D will be abandoned (grouted in place) prior to excavation. Upon completion of the excavation, the area will be backfilled with uncontaminated soils. After all disturbed areas of excavation have been successfully remediated and backfilled, the site will be graded to match surrounding grades and sloped to drain. All disturbed areas will be restored by seeding. Two monitoring wells will be installed to replace wells MPT-2-9S and MPT-2-9D. A schedule showing estimated durations of work as described in this work plan is included in Appendix A.

The following subsections are descriptions of the scope of specific work items required to implement the interim remedial action:

- Mobilization
- Clearing
- Well closure/installation
- Contaminated soil excavation
- Backfill
- Site restoration

#### **4.1 MOBILIZATION**

Mobilization will include delivering to the jobsite and work areas all construction equipment, tools, materials, supplies, storage/office trailers, and miscellaneous articles and establishing a work force sufficient to commence and sustain construction activities as required.

#### **4.2 CLEARING**

Clearing shall consist of removing all vegetation and debris within the established limits of excavation to support the remedial action activities. Above ground vegetation (e.g., trees and shrubs) will initially be removed from the site and disposed at an offsite solid waste facility. Grubbed material removed from contaminated areas will be reduced to a manageable size and transported with the contaminated soil material to a certified TSCA chemical landfill. Clearing and grubbing will be performed in accordance with the Technical Specification for Clearing and Grubbing, Appendix B.

#### **4.3 WELL CLOSURE/INSTALLATION**

##### **4.3.1 Monitoring Well Closure**

Prior to excavation, monitoring wells MPT-2-9S and MPT-2-9D (Figure 4-1, Appendix A) will be abandoned. These wells are centered in an area of known contamination and will need to be closed to ensure effective excavation of the area. The wells will be abandoned in accordance with St. Johns River Water Management District requirements and Chapter 40C-3 of the Florida Administrative Code (ABB 1994). Used well materials will be disposed of in accordance with Section 6.0, Waste Management.

### 4.3.2 Monitoring Well Installation

Once the contaminated soil is excavated and the disturbed areas are restored, two groundwater monitoring wells will be installed (to replace wells MPT-2-9S and MPT-2-9D) in accordance with Technical Specification for Well Installation, Appendix C and applicable Florida regulations.

The monitoring wells will be located in close proximity to the existing well locations. Monitor well borings will be continuously sampled and logged. Boring logs will be prepared and will accompany the monitoring well construction schematics. The wells will be constructed with 2-in. inside diameter, flush threaded, schedule 40 PVC casing, with 0.010 in. slotted screen. The exact depth of each well and length of risers and screens will be determined prior to installation and will be in accordance with the RFI Work Plan. The riser in the well shall extend from the top of the screen to the ground surface. A 20/30 silica sand filter will be placed in the annular space around the screen down to 0.5 below and to 1 ft above the top of screen. A 1- to 2-ft bentonite seal will be placed above the filter sand. The remaining annular space above the bentonite seal will be grouted with a cement-bentonite grout to the surface. A 2-in. locking cap will be installed at the top of the riser. An 8-in. diameter steel protective manhole with bolt down cover will be installed at each well location.

△

Permit requirements for monitoring well installation will be satisfied prior to drilling subcontractor mobilization. St. Johns River Water Management District and Florida Department of Environmental Protection requirements will be addressed.

△

Once the wells have been successfully installed, a licensed land surveyor will provide state plane coordinates and elevations of each well location.

### 4.3.3 Well Development

Well development will not commence until the cement bentonite grout has been in place for at least 24 hours. The drilling subcontractor installing the wells will be required to submit well development procedures prior to well development.

### 4.3.4 Documentation

Monitoring well construction logs will be prepared by a BEI hydrogeologist. Additionally, calculations will be prepared for well development which correspond to each individual well. A log book will be kept by a BEI hydrogeologist for recording notes regarding the construction, installation, and development of the monitoring wells. The drilling subcontractor will be required to submit all drill logs to BEI for the installation of the new monitoring wells.

## 4.4 CONTAMINATED SOIL EXCAVATION

### 4.4.1 Excavation Interferences

Prior to beginning excavation, the designated areas will be checked for existing utilities and other potential interferences. The BEI Construction Representative will perform a walkdown of the areas to be excavated to visually observe locations of manholes, hydrants, valves, open cuts, overhead obstructions, curbs, buildings, etc. and other unusual conditions. The Navy Public



Works office will be consulted for as-built locations of underground utilities. In addition, the BEI Construction Representative will perform utility location surveys using standard field utility detection equipment. No excavation will be initiated until the subgrade interference survey is complete.

#### 4.4.2 Limits of Excavation

The scope of work includes removing PCB-contaminated soils within the PCB Area site that exhibit levels of PCB (Aroclor-1260) greater than 1 ppm. The Draft Interim Measures Work Plan prepared by ABB Environmental Services reports that the majority of the samples collected during Phase I and II RFI activities at the 6- to 12-in. depth contained PCB concentrations orders of magnitude lower than that in corresponding surface soil samples. PCB contamination appears to be confined to the upper 6 in. of the soil. Only two samples collected from the 6 to 12 in. depth interval contained PCBs at a concentration greater than 1 mg/kg (1 ppm).

The areal extent of PCB-contaminated soil, confirmed by previous screening events, is within the boundaries of the sampling grid, as indicated on Figures 2-2 and 4-1, Appendix A. The areal extent of soils contaminated with PCB was established by delineating soils that exhibit levels of PCB between 5 and 1,700 ppm (Appendix H) (ABB 1994), as shown on Figure 4-1, Appendix A (shaded areas). This boundary does not define the actual limits of excavation. The actual limits of excavation will be determined by a field screening approach by the following sequential steps:

1. ~~The three "hot spot" (shaded) areas (Figure 4-1, Appendix A) will be defined by field screening soil samples in accordance with Section 5.0. The three "hot spot" areas (shaded) and a fourth area (outlined) (Figures 2-2 and 4-1) will be defined by field screening soil samples in accordance with Section 5.0. The shaded and outlined areas have PCB levels ranging from 5 to 170 ppm and 1 to 5 ppm, respectively.~~ △
2. Soil will be excavated in lifts of approximately 1 ft in depth, starting in the center of a hot spot area and progressing toward the outside edge of the hot spot.
3. BEI will collect soil samples at the new surface (approximately 1 ft below land surface) ~~at the same (approximate) sample location coordinates used to define the hot spots (see item 1).~~ △ The samples will be screened for PCBs with field screening equipment (see Section 5.0 for specific sampling and analysis procedures). If the results indicate PCB levels are greater than 1 ppm (Aroclor-1260), an additional soil layer (approximately 1 ft) will be removed from that area. This iterative excavation process will continue until PCB sample analyses are below 1 ppm.
4. Each layer of excavation will be performed in the same manner, starting at the center and progressing downward and outward. ~~Soil sampling will also be conducted as previously described.~~ △

Field sampling and screening will delineate soil below the 1 ppm criteria to confirm that all material requiring excavation has been removed. Confirmatory soil samples will be analyzed for PCBs to verify attainment of the cleanup criteria. Confirmatory sampling and analysis requirements are presented in Section 5.0.

Once all material has been excavated and the extent of contaminated material requiring removal is verified, a registered land surveyor will provide the necessary survey information (coordinates, cross-sections, elevations, etc.) to prepare as-built drawings of the excavation.

#### 4.4.3 Method of Excavation

Excavation will be performed in accordance with the Bechtel Navy PAC generic Technical Specification for Contaminated Earthwork and Miscellaneous Demolition, Appendix D. This specification was developed as a generic plan for Bechtel subcontractor execution. General requirements of the execution of the work are applicable, but references to Subcontractor and submittals are not applicable. Section 3.8.4 of the specification is revised to read: "Bechtel will construct and operate the onsite decontamination facility."

All excavation will be by backhoe and/or excavator where practical. In areas where interferences are present and preclude use of mechanized equipment, excavation will be by hand. All interferences such as existing utilities will be properly maintained while the excavation is in progress and remain protected until the excavation is backfilled.

#### 4.4.4 Material Transport and Disposal

As contaminated soil is excavated, the material will be loaded directly into trucks for transport to a TSCA landfill or other approved facility. All material will be loaded, transported, and off-loaded in accordance with the Technical Specification for Transportation of Contaminated Material, Appendix E. The boundary in Figure 4-1, Appendix A, represents the areal extent of excavation. Assuming a minimum of one 1-ft layer will be excavated, the approximate volume of soil to be removed is 252 cubic yards.

Proposed transportation routes for material being transported from the PCB Area Site are indicated on Figure 4-4, Appendix A.

#### 4.5 BACKFILL

Backfill will be performed in accordance with the Technical Specification for Uncontaminated Earthwork, Appendix F.

Backfilling will commence after excavation of all contaminated soil and confirmatory soil sampling and analysis is completed. Backfill will be uncontaminated, site-derived soils if available. Otherwise, a similar native soil will be used from a Navy-approved borrow source. All material placed within the open excavation will be field compacted to a minimum of 85 percent Proctor (ASTM D1557) or no less than 4 passes of the earth moving equipment. The material will be compacted in lifts of approximately 1 ft.

Prior to backfilling, an appropriate amount of crushed stone may be provided as a bottom layer in order to stabilize saturated material resulting from groundwater encroachment within the open excavation. If required, this layer of crushed stone will provide the means to achieve the desired compaction. Backfilling with a layer of gravel will be at the discretion of the Bechtel Project Superintendent.

## 4.7 SITE RESTORATION

After all areas of excavation have been successfully backfilled, the areas will be graded to drain as required. The excavation grade will be raised above surrounding elevations and sloped from the center outward to a minimum slope of 50 horizontal to 1 vertical so that runoff will flow away from the backfill area. If additional material is required to grade the area, general fill will be used from approved sources. At the completion of finish grading, all disturbed areas will be restored in accordance with Florida Department of Transportation Construction guidelines.


## 5.0 SAMPLING AND ANALYSIS PLAN

This section describes the sampling and analysis for field screening and confirmatory sampling of contaminated soils at the Solid Waste Management Unit 2, PCB Area (PCB Area). Sampling methodology and procedures described in this Sampling and Analysis Plan (SAP) are based on FDEP requirements as found in the *Florida Department of Environmental Protection Standard Operating Procedures for Laboratory Operations and Sample Collection Activities (DERQA-001/92)*.

Field screening techniques (EPA DQO Level II) using an immunoassay-based technique for detecting PCBs will be used to verify the areas where soil remediation is required and to guide excavation during construction. EPA DQO Level III data will be required for confirmatory soil and decontamination water sampling to determine that remediation goals have been achieved.

### 5.1 SAMPLING PROTOCOL

#### 5.1.1 Decontamination

Sampling equipment will be decontaminated prior to collection of each sample. Decontamination will be completed in accordance with Section 4.1, "Decontamination," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Used decontamination fluids will be containerized (drummed), stored and disposed of in accordance with ~~by~~ the Navy Public Works Department. | 

#### 5.1.2 Collection

Sampling, with the exception of field screening, will be performed in accordance with Section 4, "Sampling Procedures," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

#### 5.1.3 Sample Identification

Sample identification will be in accordance with Bechtel Project Procedure 6003, "Sample Identification and Data Encoding."

#### 5.1.4 Logbooks

Field logbooks will be used for recording all field activities. Entries will include sufficient detail to reconstruct all significant activities. Logbook entries will be completed in accordance with the minimum requirements for recordkeeping included in Section 5.0, "Sample Custody and Documentation," of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

#### 5.1.5 Chain-of-Custody Records

In order to maintain sample traceability, each sample for offsite analysis will be properly documented on a chain-of-custody record. Chain-of-custody documentation will be completed in accordance with Section 5.3, "Custody Documentation Requirements for Field Operations," of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

#### 5.1.6 Packaging and Holding Times

Sample volume requirements, frequencies, preservation techniques, minimum holding times, and container material requirements for samples are given in Table 5-1. The Field Engineer is responsible for ensuring that a sufficient volume of each sample is collected and placed in the appropriate container with the proper preservation.

The preparation of all sampling containers and the container types, preservatives, and holding times are specified in the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities* Section 4.4, "Sample Handling," and Table 5-1. Sample containers will meet all specifications outlined in the above-mentioned procedures.

#### 5.1.7 Verification

All confirmation soil sample data will be subject to a 100 percent verification. This includes data generated by field activities or as a result of laboratory analyses. The verification process will begin with manual entry or electronic loading of the data. Printouts of this information from the project database will be compared with the original hard copy of the data and resolved.

Documentation of all verification activities will be performed by the individual performing the verification. This documentation will consist of a signature of the person who performed the verification in the hard copy printouts from the project database. These signed verification printouts will be forwarded to the database manager or designee.

### 5.2 FIELD SAMPLING AND ANALYSIS

Samples identified in this section will be collected in accordance with FDEP's standard operating procedures as outlined in Section 4.3.4, "Soil Sampling Procedures." Analysis of these samples will be in accordance with Florida Department of Regulation *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*, Sections 5.0 through 10.0. Table 5-1

**Table 5-1**  
**Data Requirements for SMWU 2 PCB Area**  
**Unsaturated Soil (Vadose Zone) Sampling**

Sample Event	Analytical Method	DQO Level	Sample Frequency	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required <sup>1</sup>
<b>Field Screening Sampling</b>								
PCBs <sup>2</sup>	immunoassay test <sup>3</sup>	I	93	10 g	Specific tubes provided with each test kit	As indicated by test kit	14 days to extraction and/or analysis	Dup: 1/10 <sup>4</sup>
<b>Confirmatory Sampling</b>								
PCBs <sup>3</sup>	EPA 8080	III	10	fill jar	Glass, 8 oz. widemouth w/Teflon lined cap	Cool @ 4°C	14 days (to extraction) 40 days (to analyze)	Dup: 1/20 RB: 1/20 or weekly MS/MSD: 1/20
<b>Decontamination Water Sampling</b>								
TCLP <sup>4</sup> Metals	EPA 6010 and 7471 (Hg only)	III	1/tank	fill container	1-gal amber glass w/Teflon lined cap	Cool @ 4°C	180 days to TCLP extraction; and 180 days to analysis	N/A
TCLP Herbicides, and Pesticides	EPA 8080/8150 (pest./herb.)	III	1/tank	fill container	1-gal amber glass w/Teflon lined cap	Cool @ 4°C	7 days to solvent extraction; and 40 days to analysis	N/A
TCLP Volatile Organics	EPA 8240	III	1/tank	fill container	(3) 40-ml vials w/Teflon septum seal	Cool @ 4°C	14 days to TCLP extraction; and 14 days to analysis	N/A

<sup>1</sup> TB: Trip Blank, RB: Equipment Rinse Blank, FB: Field Blank, Dup: Duplicate, MS/MSD: Matrix Spike/Matrix Spike Duplicate

<sup>2</sup> PCBs: Polychlorinated biphenyls

<sup>3</sup> Field screening method specific for Aroclor 1260 and conforming with EPA Draft Method 4020

<sup>4</sup> 10% of the screened samples will be sent to a NEESA-certified laboratory for confirmatory analyses using EPA Method 8080 (with a 24 to 48 turnaround time). See p. 16 EPA Draft Matrix Spikes for SMWU 2

<sup>5</sup> TCLP: Toxicity characteristic leaching procedure.

provides a summary of the data requirements and analytical parameters for samples to be collected from the PCB Area.

### 5.2.1 Field Screening Sampling

Field screening of samples for PCB content will be conducted using a ~~field test kit~~ ~~an EnSys PCB RISC soil field test kit~~. The immunoassay-based field screening method for PCBs will conform to EPA Draft Method 4020. An example of such a field screening method is included in Appendix G. ~~Directions for kit use are also included in Appendix G.~~

Field screening will be performed at locations as specified in Section 4.4.2, to aid in excavation of soil over 1 ppm for PCBs. Soil will be excavated in the areas identified as contaminated with over 1 ppm as discussed in Section 4.4.2, after which field screening will be used to guide additional excavation activities. Ten percent of the field screening samples will be sent to a NEESA-certified laboratory (see confirmatory sampling under Table 5-1). The laboratory samples will be specified for a 48-hour turnaround. Table 5-1 provides the data requirements for field screening soil samples.

### 5.2.2 Confirmatory Soil Sampling

To confirm that soils contaminated with greater than 1 ppm PCBs have been excavated confirmatory soil sampling will be conducted by BEI and ABB-ES. Seventy-eight field screening samples will be gathered at locations specified in Figure 6-1, Appendix A. Samples will be analyzed using an immuno-assay test kit conforming to EPA Draft method 4020 (see data requirements under field screening in Table 5-1). Ten percent of the total number of samples will be confirmatory samples and will be sent to a NEESA-certified laboratory for analysis. Table 5-1 provides the data requirements for confirmatory sampling.

## 6.0 WASTE MANAGEMENT

Waste management will be performed as directed by the Navy. Waste management practices, as defined in the Program Hazardous Waste Management Plan, will be used as guidance and appropriately followed for this work.

Hazardous waste, if identified, will be managed in accordance with RCRA, 40 CFR Parts 260, 261, 262, 264, 265, 270, 271, and 761. Hazardous waste will not be offered to any transporters or treatment, storage, or disposal facilities that do not have an EPA identification number.

To minimize the amount of materials that must eventually be disposed, waste minimization practices will be implemented during operations. These practices will include but not be limited to:

1. No extraneous materials taken into contamination control areas;
2. Decontamination and free release of equipment used to support onsite activities, to the extent practicable; and

3. Use of consumables that can be compacted or otherwise volume reduced, to the extent practicable.

Personal protective equipment (PPE) that is not visibly soiled will be disposed of as conventional waste. Contaminated portions of PPE will be managed as hazardous waste.

Stormwater runoff and runoff controls will be implemented to prevent offsite migration of sediment or contaminated stormwater during site activities.

Water generated during decontamination activities will be containerized in a temporary holding tank or lined 55-gal drums. Prior to release of the water, a representative sample for offsite laboratory analyses will be collected. Based upon results of analytical data, the decontamination water will be properly disposed or discharged at the Navy's direction.

To practice waste minimization, PVC from monitoring well closure will be decontaminated following decontamination procedures for in-field cleaning of plastic equipment in accordance with Section 4.1 of the FDER SOPs for *Laboratory Operations and Sample Collection Activities*. Once the PVC well casing has been decontaminated, it may be cut as needed and disposed as non-contaminated construction debris, as directed by the Navy.

Soil and water generated from the installation and development of the new wells will be containerized and transported offsite to a licensed treatment/disposal facility. Sampling and analysis will be completed in accordance with the requirements of the treatment/disposal facility.

All TSCA waste excavated from the SWMU 2 PCB Area will be loaded into transport trucks ~~covered~~ and transported offsite to the disposal facility. All waste shipped offsite will be sampled according to the disposal facility's waste acceptance criteria. | Δ

Any nonhazardous solid waste that is generated as a result of mobilization and clearing activities will be properly disposed offsite at a solid waste facility.

## 7.0 HEALTH AND SAFETY PLAN

A Program Safety and Health Plan defines policies for work on the Navy RAC Project. A Site Safety and Health plan (SSHP) has been prepared for Navy RAC Bases. Addendum No. 11 to the SSHP, which defines task-specific requirements for remediation at Solid Waste Management Unit (SWMU) 2 Polychlorinated Biphenyl Area, has been prepared under separate cover.

## 8.0 QUALITY CONTROL PLAN

The Quality Control Plan (QCP) and the site-specific Quality Control Plan Addendum (QCPA) provide QC requirements for BEI for the completion of tasks associated with remedial activities at NAVSTA Mayport, Florida. Both documents will be used to direct QC activities described in this IRWP.

## REFERENCES

Draft Interim Measures Work Plan for Solid Waste Management Unit 2 Polychlorinated Biphenyl (PCB) Area, ABB Environmental Services, May 1994.

Florida Department of Environmental Regulation, *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*, Quality Assurance Section, September 30, 1992.



**APPENDIX A**  
**FIGURES**

DRAFT

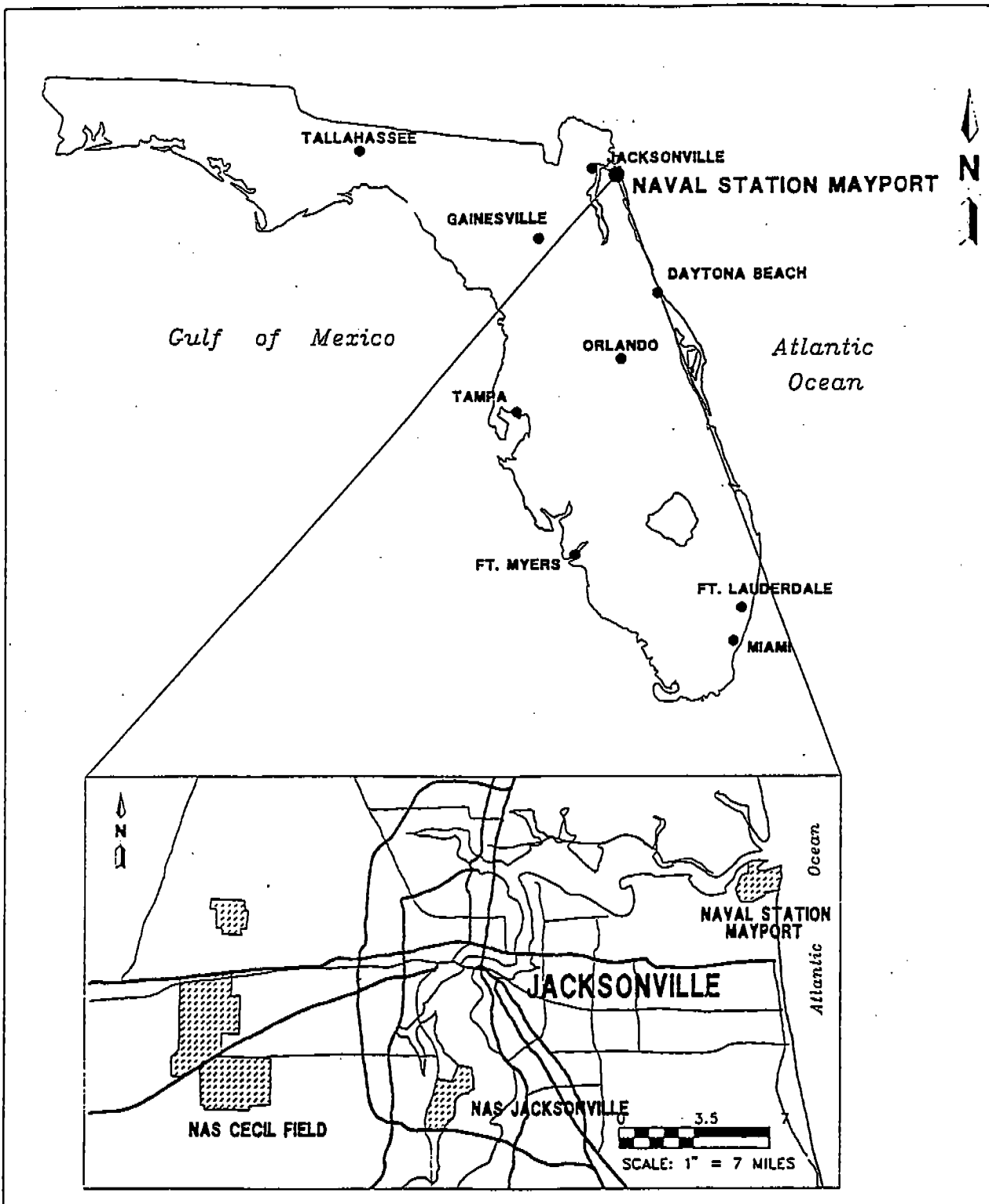


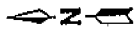
FIGURE 1-1  
REGIONAL SETTING AND  
FACILITY LOCATION MAP



INTERIM MEASURES WORKPLAN  
SWMU 2 PCB AREA



U.S. NAVAL STATION MAYPORT  
MAYPORT, FLORIDA

M:/MAYPORT/MAYLOCAT/MAH/5-13-94



ATLANTIC  
OCEAN

LEGEND

-  Approximate Location of PCB Area
-  Solid Waste Management Unit (SWMU) 2, Landfill B

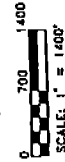
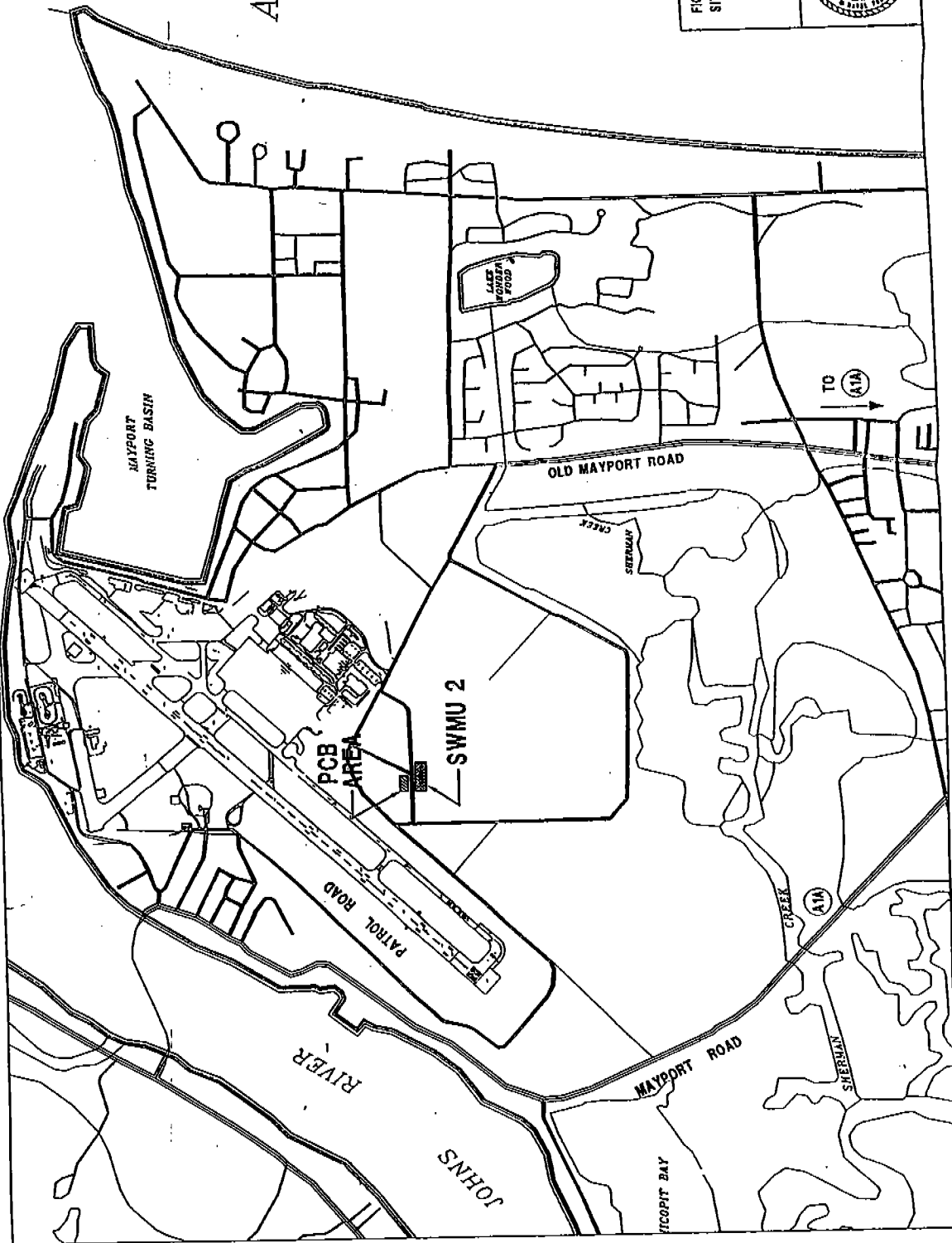
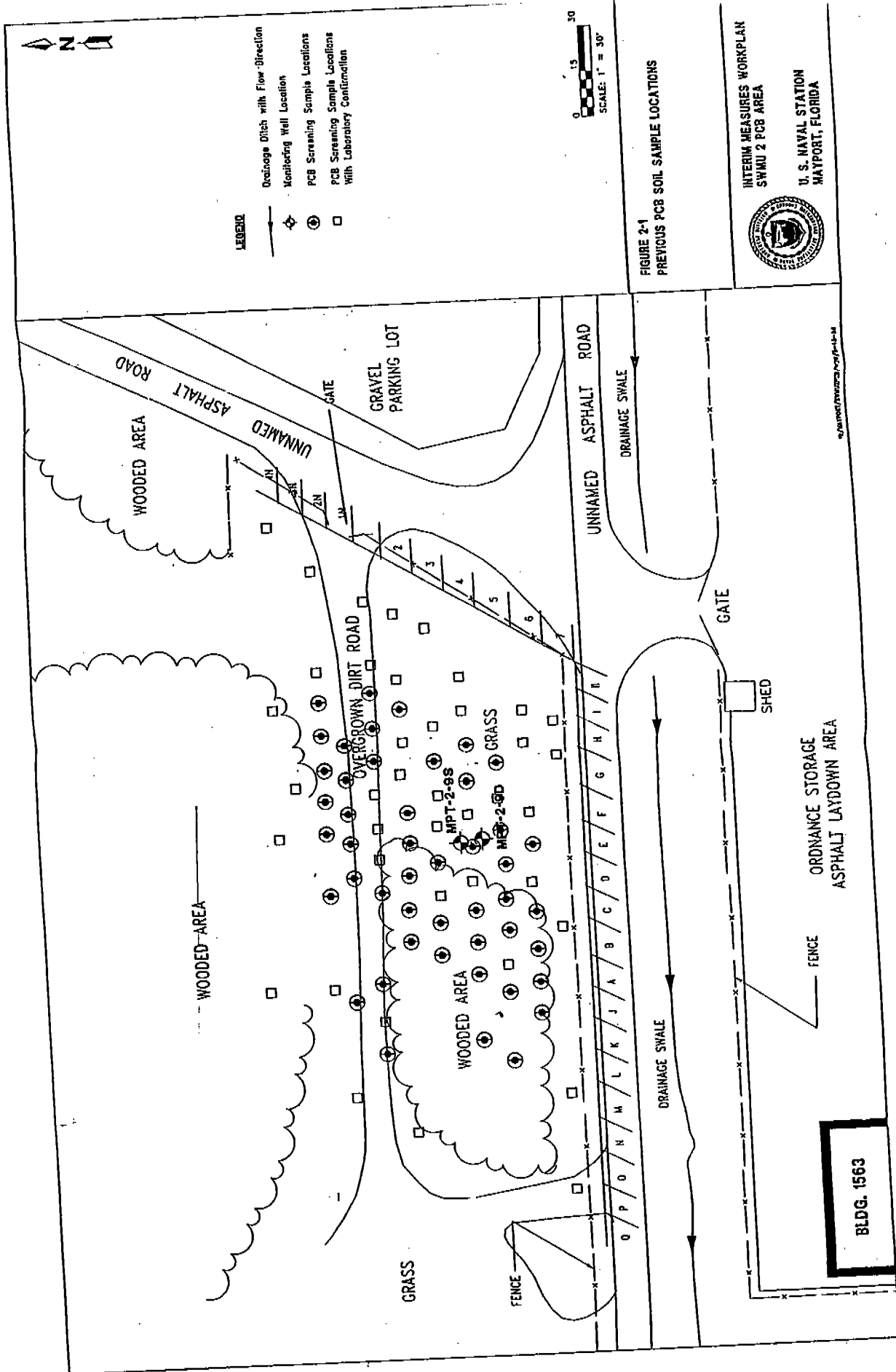


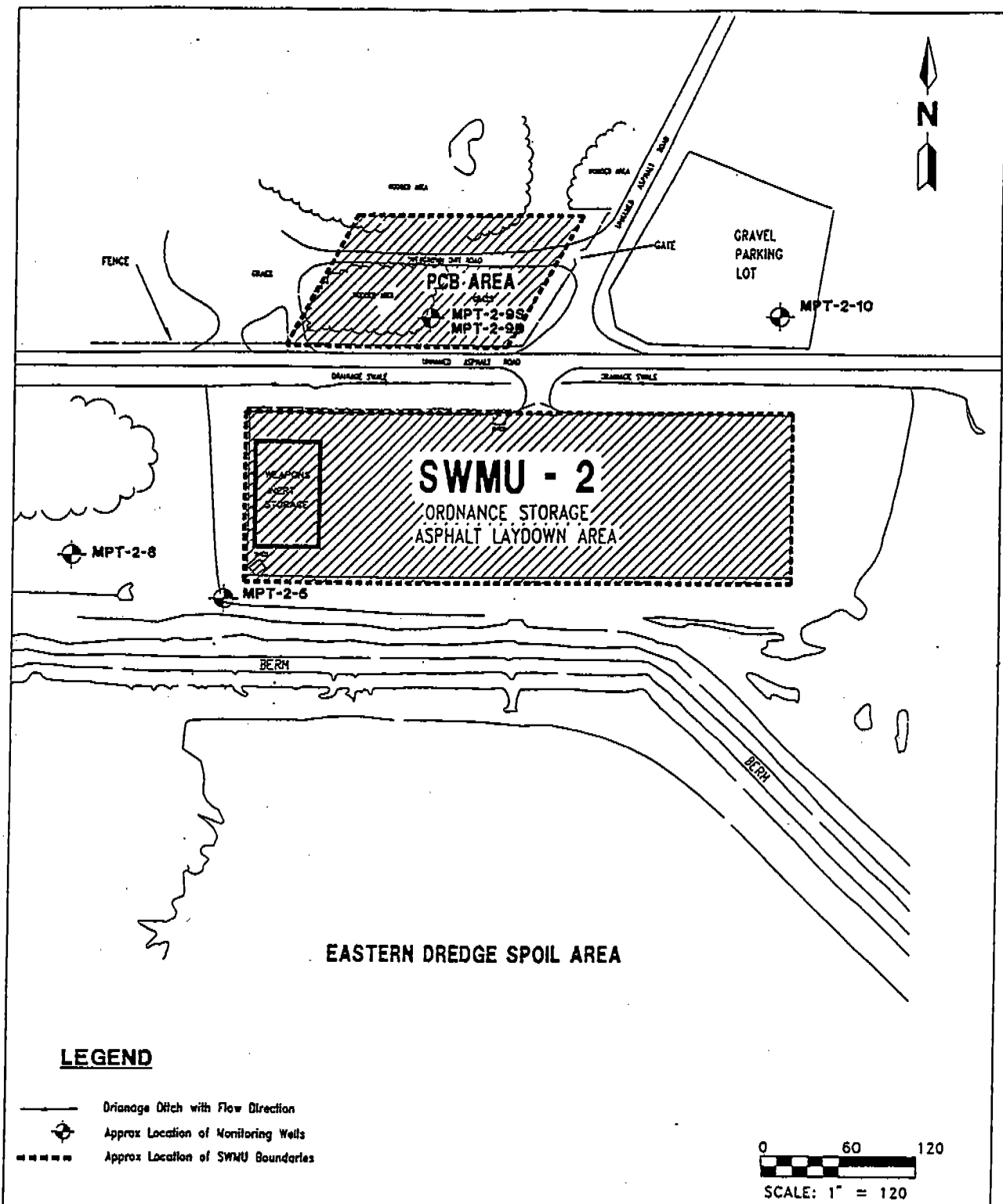
FIGURE 1-2  
SITE LOCATION MAP



INTERIM MEASURES WORKPLAN  
SWMU 2 PCB AREA  
U.S. NAVAL STATION MAYPORT  
MAYPORT, FLORIDA







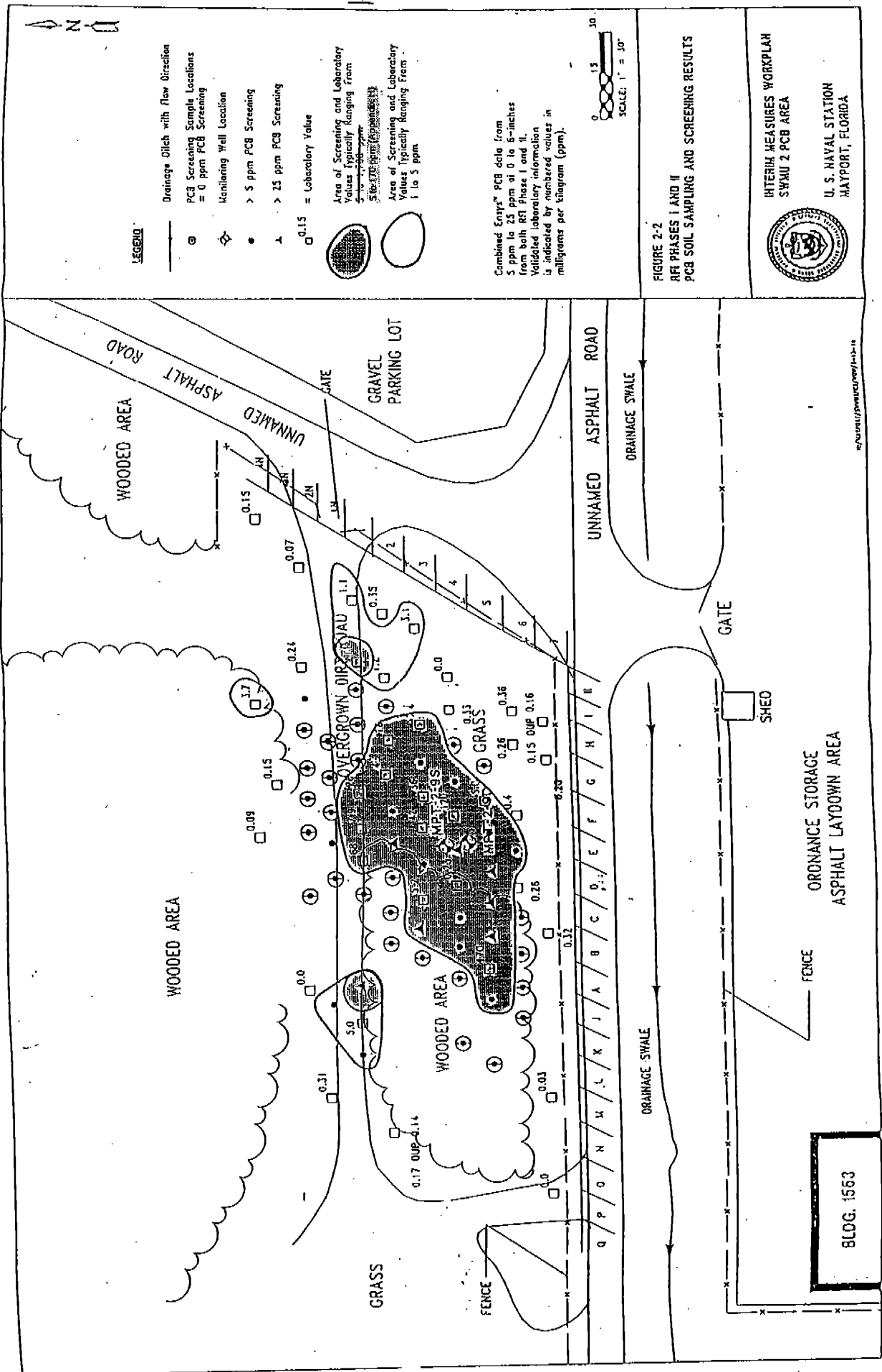
**FIGURE 1-3**  
**LOCATION OF SWMU 2, LANDFILL B,**  
**AND THE PCB AREA**

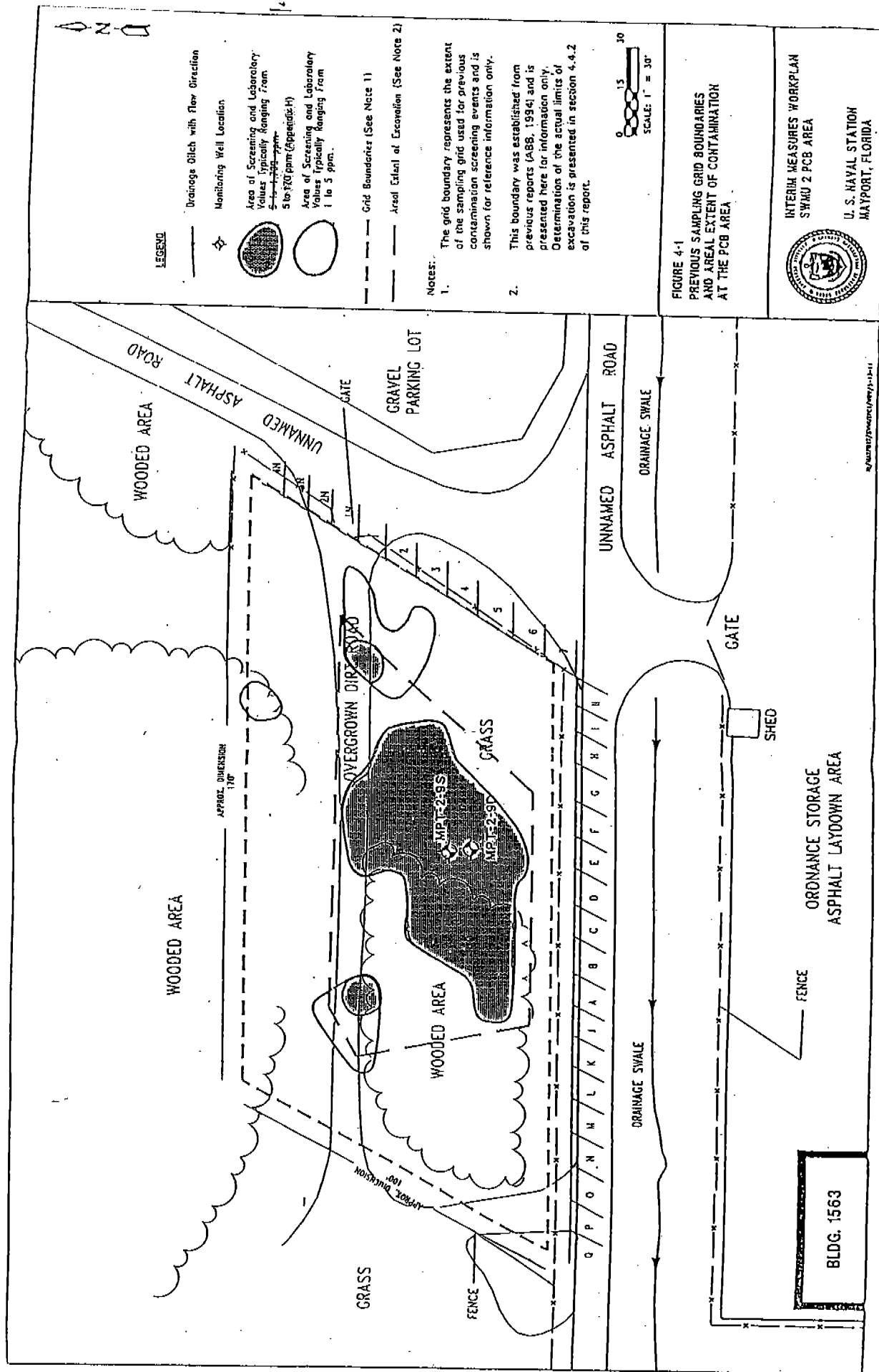
H:/MAYPORT/SWMU2PCB/WOW/5-13-94



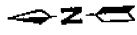
**INTERIM MEASURES WORKPLAN**  
**SWMU 2 PCB AREA**

**U.S. NAVAL STATION MAYPORT**  
**MAYPORT, FLORIDA**





14-00000-1000-1-1-1-1



ATLANTIC  
OCEAN

LEGEND

- Approximate Location of PCB Area
- Solid Waste Management Unit (SWMU 2 - Landfill B)
- Alternate Traffic Route
- Preferred Traffic Route on Patrol Road

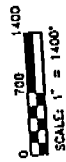
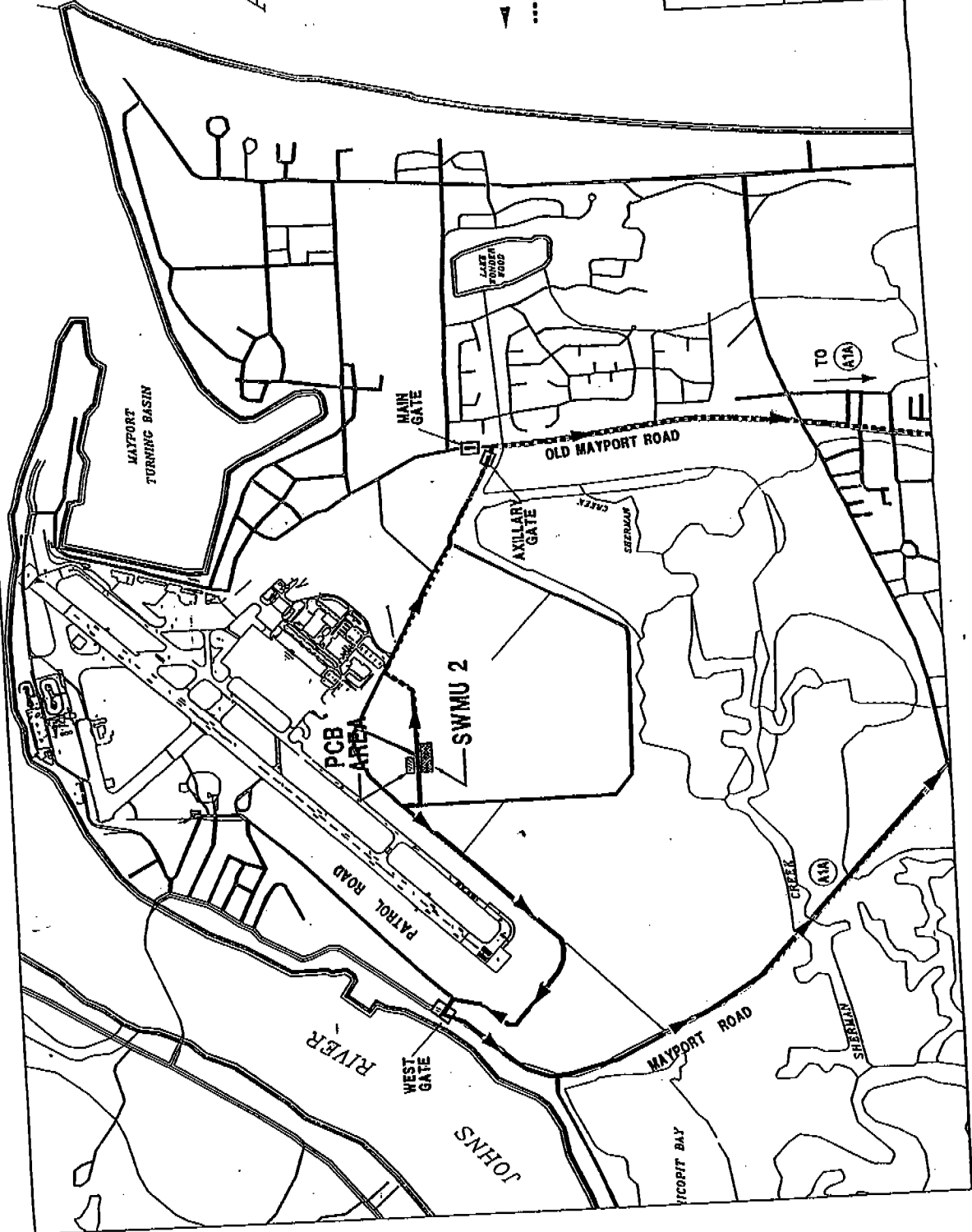


FIGURE 4-4  
PROPOSED TRAFFIC ROUTES



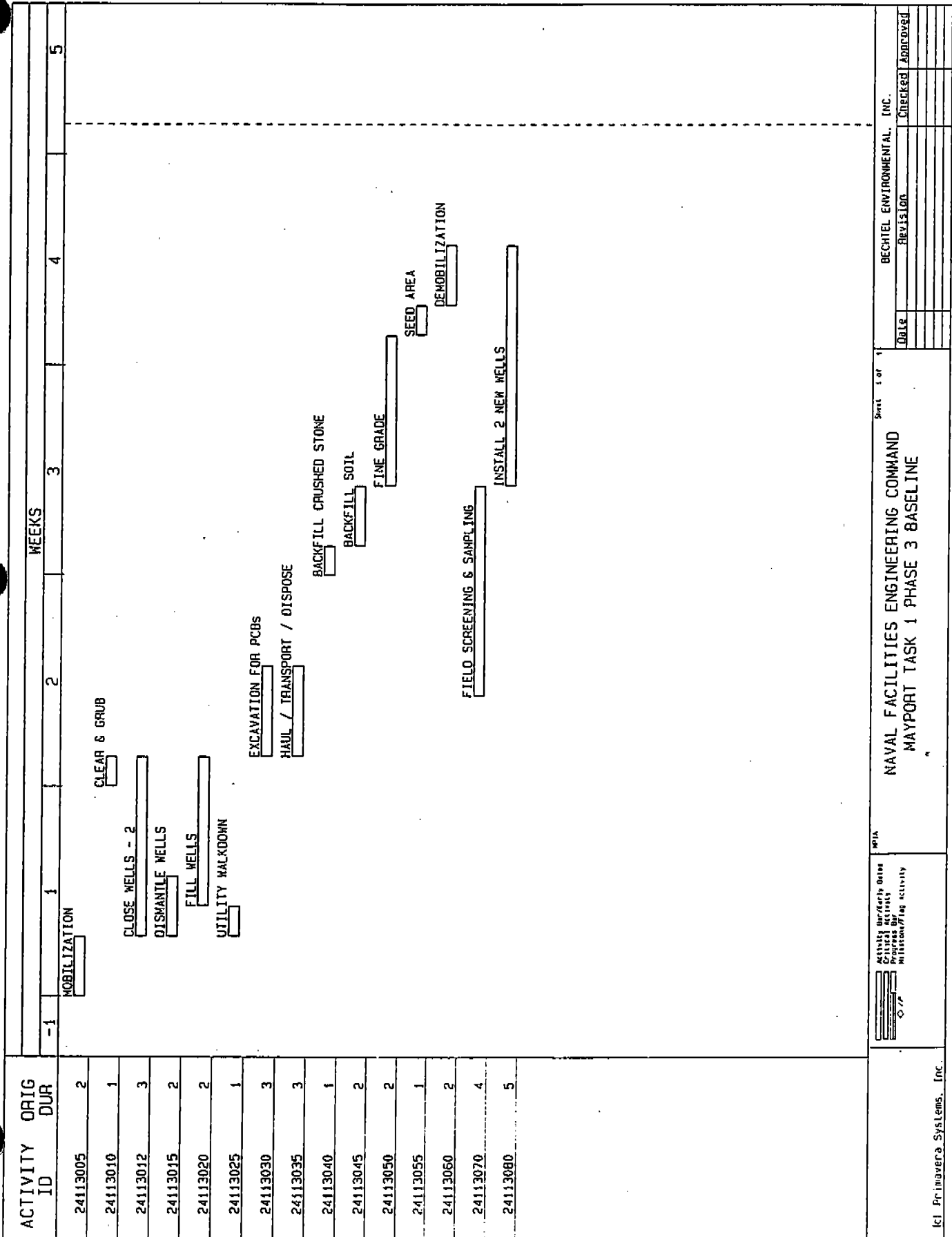
INTERIM MEASURES WORKPLAN  
SWMU 2, PCB AREA

U.S. NAVAL STATION MAYPORT  
MAYPORT, FLORIDA





# Approximate Project Schedule



**APPENDIX B**

**TECHNICAL SPECIFICATION FOR  
CLEARING AND GRUBBING**


DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

CLEARING AND GRUBBING

0	7/2/94	Issued for use	KIK	PTJ	<i>[Signature]</i>	<i>[Signature]</i>
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
ORIGIN		CLEARING AND GRUBBING	JOB NO. 22567			
			TECHNICAL SPECIFICATION			Rev.
			001-SP000-002			0
			SHEET 1 OF 4			

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5.1 CLEARING .....	4
5.2 GRUBBING .....	4

## **TECHNICAL SPECIFICATION FOR CLEARING AND GRUBBING**

### **1.0 GENERAL**

This specification defines the technical requirements and establishes the quality and workmanship required for clearing and grubbing. Not all operations defined herein may be required. Reference is directed to applicable subcontract Scope of Work and engineering drawings for specific services required.

### **2.0 ABBREVIATIONS**

None.

### **3.0 CODES AND STANDARDS**

The Subcontractor shall control the quality of items and services to meet the requirements of this specification, applicable codes and standards, and other Subcontract documents.

### **4.0 SUBMITTALS**

- 4.1 Engineering documentation requirements are summarized on the Subcontractor Submittal Requirements Summary, Exhibit F, and are augmented by detailed requirements listed herein. Bechtel Environmental, Inc., (BEI) will determine if documentation is complete as submitted by the Subcontractor, and reserves the right to reject and require resubmittal of any submittal that does not meet the Subcontract requirements.
- 4.2 Unless noted otherwise, all Subcontractor submittals shall be made to BEI at least two (2) weeks prior to use, fabrication, or implementation.
- 4.3 For those submittals needed within the two (2) weeks following Subcontract award, submittals shall be made no later than commencement of work; BEI will notify the Subcontractor of the status of the submittal by telephone within three (3) work days following receipt of the submittal.

## 5.0 FIELD OPERATIONS

### 5.1 CLEARING

- 5.1.1 Clearing shall consist of removing and disposing of only designated trees and shrubs, and mowing grass inside the work area. Trees and shrubs designated for removal shall be cut to no more than 2 inches high, measured on the side adjacent to the highest ground. Grass within the work area shall be mowed to a maximum height of one inch prior to excavation.
- 5.1.2 The Subcontractor shall clear only areas designated on the engineering drawings or as directed by BEI in the field. The Subcontractor shall protect all trees, shrubs, or plants which are not specified for removal. The Subcontractor shall be responsible for restoring any unauthorized removal or damage to trees, shrubs, or plants at no additional cost to BEI.
- 5.1.3 All removed trees and shrubs shall be cut or otherwise suitably reduced in size for safe transport. Grass clippings shall be placed in heavy duty garbage bags.
- 5.1.4 All above-ground cleared materials shall be hauled and disposed of at a licensed local sanitary landfill or stockpiled as directed by BEI.
- 5.1.5 All stumps with a trunk diameter exceeding 6 inches shall be treated by one of the following methods:
  - a. Stumps shall be ground in place with a stump cutter.
  - b. Stumps shall be uprooted, broken down, and checked for contamination. Stump debris shall be disposed of at a licensed local sanitary landfill or stockpile as directed by BEI.

### 5.2 GRUBBING

- 5.2.1 Material to be grubbed, together with logs and other organic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below original surface level of the ground in areas indicated to be grubbed. Depressions made by grubbing shall be filled with a suitable material and compacted to make the surface conform with the original adjacent surface of the ground.
- 5.2.2 Subcontractor shall verify that grubbed material is uncontaminated as directed by BEI.

**APPENDIX C**

**TECHNICAL SPECIFICATION FOR  
WELL INSTALLATION**

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION


TECHNICAL SPECIFICATION

FOR

WELL INSTALLATION

AND

WELL DECOMMISSIONING

1	3/30/94	Add well decommissioning section	MAG	SWT	RJB	RRB
0	8/2/94	Issued for construction	MAG	SWT	RJB	RRB
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
ORIGIN		WELL INSTALLATION AND WELL DECOMMISSIONING		JOB NO. 22567		
				TECHNICAL SPECIFICATION		REV
				001-SP000-004		1
				SHEET 1 OF 22		



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## 1.0 GENERAL

This technical specification establishes the quality of materials and workmanship required for installing monitoring wells at existing borehole locations. Not all activities defined herein may be required. Only those activities required in the applicable Subcontract Scope of Work and engineering drawings for specific services shall apply.

## 2.0 ABBREVIATIONS

The abbreviations listed below, where used in this specification, shall have the following meanings:

ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
ID	Inside Diameter
OD	Outside Diameter
OSHA	U.S. Occupational Safety and Health Administration
psi	Pounds per square inch
PVC	Polyvinyl chloride

## 3.0 QUALITY STANDARDS

Subcontractor shall control the quality of items and services to meet the requirements of the Subcontract documents. Unless otherwise specified or shown, the following codes and standards of the latest issue at the time of bid shall apply to the extent indicated herein.

ASTM A 53	Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless
ASTM C 136	Standard Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 150	Portland Cement
ASTM A 312	Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipe
ASTM D 5299	Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes and other devices for Environmental Activities
ASTM F 480	Thermoplastic Water Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), Schedules 40 and 80

#### **4.0 SUBMITTALS**

Not all submittals defined herein may be required. Only engineering document requirements summarized in Exhibit F, Subcontractor Submittal Requirements Summary (SSRS) shall apply. Submittals identified shall meet the detailed requirements herein.

BEI will determine if documentation is complete as submitted by the Subcontractor, and reserves the right to reject and require resubmittal of any submittal that does not meet the Subcontract requirements.

#### **5.0 EQUIPMENT AND MATERIALS**

##### **5.1 DRILLING EQUIPMENT AND MATERIALS**

Each drilling rig and support equipment shall be provided with all necessary protection measures to operate safely in accordance with the OSHA requirements set forth in 29 CFR 1910 and 29 CFR 1926. Equipment should be adaptable to work in conditions associated with hazardous waste/environmental investigation.

Drilling equipment required to ream out previously installed boreholes shall be rotary type with hydraulic feed and in good working condition. Drill rig(s) shall be equipped to minimize disturbance in the areas in which they are drilling. Drilling equipment shall be of sufficient capacity to ream the holes to the specified diameter and depth in accordance with the subcontract documents.

Air rotary drilling rigs when allowed by BEI shall have filter systems to prevent the introduction of compressor oil into the downhole air stream. Dust collection system(s) shall include borehole, containment skirt and cyclone. The system shall be used to funnel cuttings to one location in a controlled manner. The system output shall be directed into the 55-gallon UN1A1 or UN1A2 steel drums (49 CFR 173). At no time shall oil or other additives be introduced into the borehole without prior written approval from BEI.

Portable mud tubs shall be required for mud rotary drilling.

Materials for drilling shall include all augers, temporary casings, casing shoes, tools, bits suitable for penetrating the materials being drilled, drill rods, pipe, pumps, potable water, compressors, and other incidentals necessary to perform the work in accordance with the Subcontract documents. Drilling fluid shall be potable water.

##### **5.2 CONDUCTOR CASING**

Conductor casing shall be of a diameter appropriate for the type well installation as shown on either the engineering drawings or Scope of Work as applicable. Conductor casing shall be carbon steel or PVC pipe, unless otherwise specified, with open ends, or equivalent material

submitted to BEI for review prior to use. Pipe gauge or thickness shall be sufficient to support specific well requirements.

### **5.3 RISER PIPE**

#### **5.3.1 General**

Riser pipe shall be of a diameter appropriate for the type well installation as shown on the engineering drawings or Scope of Work as applicable. Riser pipe shall be clean, straight, and free of obstructions. When certification of cleanness cannot be provided, all riser pipes will be cleaned in accordance with cleaning guidelines for small equipment set forth in Section 6.0 of this specification. The Subcontractor shall submit a catalog cut to BEI for review prior to use.

#### **5.3.2 Stainless Steel**

Riser pipe shall conform to ASTM A 312 and shall be flush threaded joint, Schedule 5 S, Type 316 or 316L stainless steel pipe.

#### **5.3.3 PVC**

Riser pipe shall conform to ASTM F 480 and shall be flush threaded joint, Schedule 40 or 80 PVC pipe as indicated in the Scope of Work or engineering drawings as applicable. When certification of cleanness cannot be provided, all riser pipes will be cleaned in accordance with cleaning guidelines for small equipment set forth in Section 6.0 of this specification.

### **5.4 SCREEN**

#### **5.4.1 General**

Well screen shall be compatible for use with the specified riser pipe. The width of the slots shall be as shown on the engineering drawings or the Scope of Work as applicable. Screens shall be of a diameter appropriate for the type well installation as shown on the engineering drawings or the Scope of Work as applicable. Screens shall be in multiples of 5 or 10 feet in length. The Subcontractor shall submit a catalog cut of the screen material to BEI for review prior to use. The bottom of the screen shall be fitted with flush threaded joint blank casing (riser pipe) at least 1 foot in length to serve as a sump, or as shown on the engineering drawings or the Scope of Work as applicable. The bottom of the blank casing shall be capped.

#### **5.4.2 Stainless Steel**

Screens shall be flush threaded joint, Type 316 or 316L stainless steel, continuously slotted, wire wrapped and shall have a minimum open area of approximately 13 square inches per linear foot. When certification of cleanness cannot be provided, all screens will be cleaned in accordance with cleaning guidelines for small equipment set forth in Section 6.0 of this specification.

### 5.4.3 PVC

PVC screens shall be flush threaded joint, Schedule 40 or 80 PVC, as indicated in the Scope of Work or the engineering drawings as applicable, and shall have a minimum open area of 4.8 square inches per linear foot. When certification of cleanness cannot be provided, all screens will be cleaned in accordance with cleaning guidelines for small equipment set forth in Section 6.0 of this specification.

### 5.5 FILTER PACK

Filter pack material shall be clean, well-graded sand, free from deleterious material, conforming to ASTM C 136 Fine Aggregate. Filter pack material shall have a uniformity coefficient of less than 2.5, and shall meet the following dry sieve analysis:

<u>U.S. Standard Sieve</u>	<u>Percent Passing</u>
# 8	100%
# 20	5 - 95%
# 40	0 - 10%
# 60	0 - 6%
#100	0 - 5%
#200	0%

The Subcontractor shall submit a certified sieve analysis of the filter pack material to BEI for review prior to use.

### 5.6 ANNULAR SEAL

The annular seal above the filter pack shall consist of bentonite pellets tamped in place to the thickness shown on engineering drawings or the Scope of Work as applicable. Bentonite for the annular seal shall meet the following dry sieve analysis:

<u>U.S. Standard Sieve</u>	<u>Percent Passing</u>
1/2#	100%
# 10	0 - 20%

Bentonite granules are not acceptable. Bentonite pellets shall be high-swelling and sodium-based material. The Subcontractor shall submit a catalog cut to BEI for review along with identification of source (location) from which the bentonite was mined prior to use. BEI reserves the right to check the bentonite sample to determine if the bentonite meets the requirement of this specification.

Alternatively, BEI may require the Subcontractor to use Pure Gold (trade name) grout or equal, a high solids bentonite clay grout manufactured by American Colloid Company.

## 5.7 BACKFILL MATERIALS

The following materials shall be used as backfill only to the extent allowed in the Scope of Work or engineering drawings.

### 5.7.1 Cement/Bentonite Grout

Cement/bentonite grout shall be mixed approximately in the following proportions: 7.5 gallons of water and 2.5 pounds of bentonite per 94 pound sack of Portland cement. Water shall be potable.

Bentonite shall be free flowing, high-swelling, sodium-based bentonite meeting the following dry screen analysis:

<u>U.S. Standard Sieve</u>	<u>Percent Passing</u>
#16	100%

The Subcontractor shall submit a catalog cut of the bentonite to BEI for review prior to use. The catalog cut shall include the source (location) from which the bentonite was mined. BEI may check the bentonite sample to determine if the bentonite meets the requirement of this specification. Portland cement shall be Type I or Type II in accordance with ASTM C 150.

## 5.8 SURFACE CASING AND PROTECTIVE CAP

This section applies to the outer protective surface casing for standard and hardened surface seals only. Requirements for flush mount surface seals are in Section 5.10. Surface casing shall be steel pipe in accordance with ASTM A 53 and/or square steel covers (e.g. B-K TC-200) of an appropriate diameter and schedule for the type well installation as shown on the engineering drawings or the Scope of Work as applicable. Surface casing shall be vented and fitted with a lockable steel protective cap. The minimum thickness of the steel used in cap shall be 3/16 inch. Casing shall be installed into the borehole after the annular grout has set-up for at least 24 hours. The casing shall be plumb centered around the riser pipe. The protective casing shall be placed so that the cap of the inner well casing is exposed when the outer casing is opened.

## 5.9 WELL CAP

Each well cap shall consist of a slip-on or threaded, vented cap fittable to and of the same material as the specified riser casing unless otherwise authorized by BEI. The Subcontractor shall submit a catalog cut or shop drawing of the well cap to BEI for review prior to use. Well cap for flush mount surface seal shall be padlockable.

#### **5.10 SURFACE SEAL**

Surface seal shall be concrete with Type I or II Portland cement with minimum 28-day compressive strength of 3000 psi. Rebar shall be minimum Grade 40. The surface seal shall extend a minimum of two feet below ground level or below the frost line, whichever is greater.

#### **5.11 CENTERING DEVICES**

Centering devices shall be stainless steel and shall maintain the riser casings in the center of the drill holes. Subcontractor shall submit catalog cut or shop drawing of the centering devices to BEI for review prior to use.

#### **5.12 DRILL SPOILS HANDLING EQUIPMENT**

The Subcontractor shall containerize spoils in 55-gallon UN1A2 steel drums (49 CFR 173), load, haul, unload and place them at location(s) onsite as designated by BEI. Equipment used for this purpose shall prevent the spread of contamination.

#### **5.13 SOAP**

Soap shall be a biodegradable, laboratory grade, phosphate free soap such as Liquinox, or equal material. A catalog cut shall be submitted to BEI for review prior to use.

#### **5.14 LUBRICANTS**

Tool joint lubricants other than Teflon tape, graphite powder, vegetable oil, and/or apiezon grease (e.g., Dow Corning High Vacuum grease or equal) shall not be used unless approved by BEI prior to use. For the threaded connections on the riser pipe assembly, no lubricant other than potable water is allowed unless approved otherwise by BEI.

#### **5.15 FLUSH MOUNT SURFACE SEAL**

For well installations in areas where an above grade casing would present a hazard or is otherwise undesirable, BEI will require the Subcontractor to install a flush mount surface seal. The cover for this seal must have a pentagon lock nut or other intrusion deterrent device approved by BEI. The well cap for this type installation must be vented and lockable with a BEI provided padlock. The profile of the seal must slope outward to minimize the amount of precipitation/runoff entering the cover.



## **5.16 PROTECTIVE BARRIERS**

### **5.16.1 Temporary Perimeter Barricades**

Perimeter barricades shall be provided around borehole work areas during all work operations. Barricades shall be placed to provide sufficient mobility for work operations within the barricaded area and shall not interfere with activities of occupants of the work areas. Barricades shall remain in place until all work within that barricaded area is completed, at which time barricades shall be removed.

Perimeter barricades around each borehole location shall consist of snow fence or other suitable material to preclude inadvertent entry into work areas. The Subcontractor shall submit the proposed type of perimeter barricade to BEI for review prior to use.

### **5.16.2 Permanent Perimeter Barricades**

A minimum of three (3) guard posts shall be installed around above-ground wells. The guard posts shall be steel pipe 3/4 inches in diameter and a minimum five foot length installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. Concrete shall also be poured into the steel pipe for additional strength. Steel rails and/or other steel materials can be used in place of steel pipe but will require prior approval from BEI. Additionally, the posts shall be plumb and painted with a diagnostic color as directed by BEI.

## **5.17 BOREHOLE COVERS**

Borehole covers shall be placed over open boreholes, regardless of depth, to minimize hazardous conditions and the accidental introduction of objects into the borehole. Covers shall remain in place until boreholes are completed as wells or are permanently closed.

Borehole covers shall consist of steel plate or other suitable material to preclude inadvertent access to boreholes. Covers shall also be equipped to prevent surface water runoff from entering the borehole. Subcontractor shall provide details of proposed borehole covers to BEI for review prior to use.

## **6.0 FIELD OPERATIONS**

### **6.1 CLEANING**

The work areas shall be kept in a neat and orderly condition at all times. Items shall not be brought onto the site nor removed from the site until so authorized by BEI.

Deposits of mud and other materials adhering to equipment shall be removed while at the drill site. This material shall be broadcast in the vicinity of the hole or containerized in 55 gallon UN1A2 steel drums (49 CFR 173), as directed by BEI.

Decontamination of all equipment shall occur at a decontamination pit or pad, either excavated or built above grade by the Subcontractor. The pit or pad and surrounding area will be lined with heavy duty plastic film of sufficient width to provide a seamless, lapless liner for the pit. All cleaning of drill rod, auger flights, well screen and casing, etc. will be conducted above the plastic film using non-wood saw horses or other appropriate means.

Cleaning shall utilize brushes, scrapers, rags, and other items as necessary to remove surface dirt. Equipment shall be decontaminated at the exclusion zone of the intrusive activities. Small field equipment, augers, drilling bits, large tools, drill rigs, monitoring well supplies and other large items shall be cleaned at this zone. All equipment and materials required for decontamination including water required for this purpose shall be provided by the Subcontractor. Potable water (tap water from any municipal water treatment system) shall be used. Organic free water and organic free water systems shall be stored separately from gasoline and/or fuel containers and gasoline powered equipment to prevent cross-contamination.

Small equipment shall be decontaminated as follows:

1. Wash thoroughly with laboratory detergent and tap water using a brush to remove all particulate matter and surface film.
2. Rinse thoroughly with tap water.
3. Rinse thoroughly with deionized water.
4. Rinse twice with isopropanol using only teflon-squeeze bottles.
5. Rinse thoroughly with organic-free water and allow to air-dry as long as possible.

Organic-free water is defined as water that contains no pesticides, herbicides, extractable organic compounds and less than 5  $\mu\text{g/L}$  of purgeable organic compounds as measured by a low-level GC/MS scan. In addition, no metals or other organic compounds should be detected at routine detection limits.

6. If organic-free water is not available, allow equipment to air dry until the isopropanol has evaporated.

Decontaminated equipment shall be stored on clean tables with polyethylene sheeting and wrapped in aluminum foil between uses. Following decontamination, the sampling equipment shall not be allowed to touch the ground prior to use. All decontamination fluids shall be contained and care shall be taken to ensure that the isopropanol and other fluids do not contact

the ground surface. Isopropanol rinsates shall be segregated from other decontamination fluids and containerized. The Subcontractor shall store decontamination fluids in 55-gallon UN1A1 steel drums, load the drums, haul, unload and place them at the locations designated by BEI. Large equipment shall be decontaminated using the following procedure:

1. Remove heavy accumulation of mud at drill site.
2. Move equipment to the exclusion zone of intrusive activities after sampling/field activities are complete.
3. Decontaminate equipment with a high pressure steam cleaner which utilizes a soap and water cycle. Scraping and scrubbing may be necessary to remove encrusted material. Items shall be placed on sawhorses, pallets, or the equivalent to prevent contact with the ground.
4. Rinse the equipment with isopropanol if needed and appropriate, followed by a tap water rinse.
5. Place equipment on polyethylene sheeting, saw horses, or clean pallets and allow to dry. Saw horses and pallets shall not be constructed of wood.
6. Sampling and field equipment shall not contact the ground surface prior to the next sampling location. Wrap appropriate equipment (i.e., monitoring well installation supplies) in polyethylene sheeting and secure with duct tape. The Subcontractor shall store decontamination fluids in 55-gallon UN1A1 steel drums (49 CFR 173), load the drums, haul, unload and place them at the locations designated by BEI.

## **6.2 WELL INSTALLATION**

### **6.2.1 General**

Wells shall be installed in previously drilled boreholes at the locations shown on the engineering drawings or the Scope of Work as applicable.

### **6.2.2 Annular Space**

The borehole shall be of sufficient diameter so that well installation and construction can proceed without difficulties. To assure adequate size, a minimum 2-inch annular space is required between the well casing and the borehole wall (or the hollow stem auger wall).

### **6.2.3 Installing Conductor Casing for Double Cased Wells**

Double cased wells shall be constructed when there is reason to believe that interconnection of two aquifers by well construction may cause cross contamination, and/or when flowing sands make it impossible to install a monitoring well using conventional methods. A pilot borehole

shall be bored through the overburden and/or the contaminated zone into a clay confining layer, five feet below the known elevation of contamination or bedrock. A conductor casing shall then be placed into the borehole and sealed with grout. The borehole and conductor casing shall extend into tight clay a minimum of five feet or into competent bedrock a minimum of two feet. The total depths into the clay or bedrock will vary, depending on the plasticity of the clay and the extent of weathering and/or fracturing of the bedrock. The size of the conductor casing shall be of sufficient inside diameter (ID) to contain the inner casing, and the 2-inch minimum annular space. In addition, the borehole shall be of sufficient size to contain the conductor casing and a 2-inch minimum outer annular space, if applicable. The conductor casing shall be grouted by either the tremie method or by pressure grouting to within 2 feet of the ground surface. The grout shall be pumped into the annular space between the conductor casing and the borehole wall. This can be accomplished by either placing the tremie tube in the annular space and pumping the grout from the bottom of the borehole to the surface, or placing a grout shoe or plug inside the casing at the bottom of the borehole and pumping the grout through the bottom grout plug and up the annular space on the outside of the casing. If the conductor casing is set into very tight clay, both of the above methods might have to be used, because the clay usually forms a tight seal in the bottom and around the outside of the casing preventing grout from flowing freely during grout injection. Bridging is not anticipated in bedrock thus; conductor casing set into bedrock normally will have space enough to allow grout to flow freely during injection. A minimum of 24 hours shall be allowed for the grout plug (seal) to "set" or cure before attempting to drill through it. The grout mixture used to seal the outer annular space can be either a neat cement, cement/bentonite, cement/sand, or a pure bentonite grout. However, the seal or plug at the bottom of the borehole and conductor casing shall consist of a Type I portland cement/bentonite or cement/sand mixture. The use of a pure bentonite grout for a bottom plug or seal is not acceptable. When drilling through the seal, care shall be taken to avoid cracking, shattering, and/or washing out of the seal. If caving conditions exist so that the conductor casing cannot be sufficiently sealed by grouting, the conductor casing shall be driven into place with a grout seal placed in the bottom of the casing.

#### 6.2.4 Installing Screen and Riser Casing

Before installation of the riser pipe assembly (e.g., riser pipe, screen, sump, and bottom cap), the final depth of the hole shall be measured with a weighted tape to  $\pm 0.1$  feet, and the assembly and appurtenances cleaned in accordance with Section 6.0.

Equilibrium or excess water pressure inside the hollow-stem auger relative to the observed groundwater level shall be maintained at all times during the screen and riser installation (if necessary by adding potable water to the hollow stem) to prevent a "quick" condition at the bottom of the hole. This is particularly applicable when the bottom consists of loose, sandy soils.

The riser pipe assembly shall then be lowered into the hole. In boreholes greater than 50 feet deep, centering devices shall be used to maintain the entire riser pipe assembly in the center of the borehole. Centering of riser pipe assembly through the hollow stem of an auger shall be

provided by suspending the assembly using the cable/hoist method such that the riser pipe assembly is located in the center of the borehole upon completion. All cuttings shall be flushed out of the hole prior to the installation of the monitoring well.

#### **6.2.5 Installing Filter Pack**

As soon as the riser pipe assembly is in place, clean water shall be pumped into the riser pipe so that return flow will rise to the surface through the annular space and clean the hole. Equilibrium or excess water pressure inside the hollow-stem auger relative to the observed groundwater level shall be maintained at all times. The pumping rate shall be adequate to flush the riser pipe assembly and hole. The filter pack shall then be placed into the annular space between the well screen and borehole wall by tremie method. The filter pack shall extend from the bottom of the hole to at least two feet but not more than five feet above the top of the screen. The temporary casing, if applicable, shall be removed upon direction from BEI.

Unless noted otherwise on the drawing, the Subcontractor shall install a meter and backflow preventer and use the designated water supply for dust control, flushing monitoring wells, and decontaminating drilling and sampling equipment including temporary casings. The equipment required may include pumps, water trucks or trailers, hoses and all other items necessary to meter and transfer the water supply to the work area. All water discharged from the boreholes during well installation shall be collected in 55-gallon UN1A1 steel drums (49CFR173). Drums shall be loaded, hauled, and unloaded to staging areas specified by BEI. Water shall be controlled by the Subcontractor to prevent erosion and other damages.

#### **6.2.6 Installing Seal and Backfill**

An annular seal of bentonite pellets shall be installed in the hole after the filter pack is placed. The bentonite pellets shall be tamped in place using a rod, pipe, or heavy weight attached to a rope. The minimum thickness of this bentonite seal, after tamping, shall be two feet. The completed bentonite seal shall be allowed to hydrate for a minimum of eight hours or the manufacturer's recommended hydration time, whichever is greater, before proceeding with the grouting operation. Following placement of the annular seal, the remainder of the annular space between the riser casing and borehole wall shall be filled with cement/bentonite grout up to two feet below ground surface as shown on the engineering drawings. The cement/bentonite grout shall be installed by placing a rod, pipe, or hose to a point immediately above the seal and pumping the grout into the hole. The tremie pipe will be equipped with a side discharge port to preclude disruption of the annular seal and/or filter pack. Should loss or shrinkage of grout occur, holes shall be refilled until they remain full. The grout shall be allowed to set-up for a minimum of 24 hours before the concrete surface pad is installed.

#### **6.2.7 Well Testing**

The alignment of the well screen will not be considered acceptable unless a decontaminated, clean, straight pipe of appropriate diameter can be passed freely down the length of the well.

This test shall be performed approximately 24 hours after completion of grouting by the Subcontractor. Upon completion, each well shall be tested after annular seal and grout have set to confirm the well is operative. This shall be accomplished by bailing water from the riser casing and measuring recovery of the water level. An alternative testing method that may be requested by BEI is the slug method whereby the decay of the water level induced by the slug will be monitored.

#### **6.2.8 Surface Casing, Cap and Seal**

The surface pad, surface casing, cap, and seal shall be installed at each monitoring well as shown on the engineering drawings or the Scope of Work as applicable.

#### **6.2.9 Well Development**

Installed wells shall be developed to maximize the yield of water per foot of drawdown, and extract from the water-bearing formation the maximum practical quantity of fines as may be drawn through the screen when the well is pumped under maximum conditions of drawdown. Well development shall not commence until the cement/bentonite grout has been in place for at least 72 hours. The procedure shall include water collection and disposal plan. Development shall proceed by pumping and/or bailing (using stainless steel or teflon bailers) techniques. Development will continue along the length of the well screen until the well produces clear water, or the water temperature, pH, and conductivity have stabilized as indicated by three consecutive measurements within 10 percent of each other or a minimum of 10 well volumes has been removed. In the event wells are bailed dry, the wells must be developed to dryness 10 times to be considered complete. Development water shall be containerized by the Subcontractor in 55-gallon UN1A1 steel drums (49 CFR 173), loaded, hauled, unloaded and placed at staging areas designated by BEI. The Subcontractor shall submit a step-by-step well development procedure prepared using the above guidelines to BEI for review and approval prior to its implementation.

#### **6.2.10 Permeability Testing**

Following well development, permeability testing will be performed in selected wells screened. The method for permeability testing will be determined by BEI based on well development test results.

The following narrative provides general guidelines for performing a permeability test by the slug test method, although BEI may choose an alternate method.

#### **Preparatory Activities**

- Develop each well
- Calculate gravel porosity
- Decontaminate all intrusive equipment

## Field Equipment

The following equipment may be utilized for the slug test.

- Electronic water level indicator
- Pressure transducers (5 psi, 10 psi)
- Dedicated field logbook and semi-log graph paper
- Enviro-labs data logger Model DL-120-MCP or equivalent
- Cylindrical slug (solid), 1.5 in. O.D. and/or 3.5 in. O.D., 60 in. long
- Liquinox detergent, or equivalent
- Deionized, organic-free water
- Scrub brush
- Disposable 3/8 in. cord
- Pesticide grade isopropanol

## Procedures

- Measure the water level in the well using the electronic water-level indicator and record the data in the field log book.
- Complete the system setup procedures by setting the internal clock in the data logger, input transducer scale factors, and selecting appropriate logging sequence for each well. Lower transducer into well to a depth of 8 ft beneath static water level to reduce the possibility of damage to the transducer by the slug. Allow transducer to stabilize, and record initial head reading in feet. Input the logging sequence in preparation of slug test.
- Lower slug into well, stopping at a pre-determined depth immediately above the static water.
- Instantaneously introduce the slug into the water so that the entire slug is submersed, keeping the bottom of the slug from touching the pressure transducer. Once the well has recovered to 90 percent or greater of the increase in water level elevation due to submergence of the slug, store data in unit memory as water level in the falling head measurements.
- Reset the data logger to standby mode.
- Leaving the logging sequence the same as for the falling head test, instantaneously remove the slug from the water. Tie off cord and leave the slug in the well suspended above the water surface.
- Once the water level in the well has recovered to 90 percent or greater of the decrease in water level elevation due to slug removal, store data in unit memory as rising head measurement.

- Output data in memory to a printer upon the completion of the test at each well.
- Evaluate the data obtained in monitoring wells and calculate the hydraulic conductivity and transmissivity.

A step-by-step slug testing procedure prepared using the above guidelines shall be submitted to BEI for approval prior to its implementation.

#### 6.2.11 Drawdown Tests

The drawdown of each well during a 2-hour pumping period shall be measured. If the well yield is not sufficient to maintain a 2-hour pumping period, the pump rate shall be slowed to maintain pumping during this period. The discharge rate shall be determined using a stop watch and a calibrated bucket.

The water level in each well shall be determined by direct measurement using an electric sounding device. Water level shall be measured once every 30 seconds for the initial 10 minutes, once every minute for the next 10 minutes, and then once every 5 minutes. Both the time and drawdown for each water level measurement shall be recorded.

The time versus the drawdown shall be plotted on semi-logarithmic graph paper. The time in minutes after the start of pumping should be plotted on the logarithmic scale and the drawdown in feet plotted on the linear scale. The well's specific capacity (when the pumping level stabilizes) shall be calculated by dividing the discharge rate by the drawdown. If the pumping level has not stabilized after two hours, the 24-hour drawdown shall be estimated by extrapolating the time-drawdown plot. The predicted drawdown shall be used to calculate the well's specific capacity.

After 2 hours, pumping shall be stopped and water level measurements shall be taken at the following intervals:

0, 15, 30, 45 seconds  
1, 2, 4, 8, 16, 30 minutes

and then at 15 minute intervals until the well has recovered to 90 percent of its static level.

Recovery data shall be recorded and time versus drawdown shall be plotted on the semilog graph paper. Recovery and pump data shall be verified to ensure that specific capacity calculations are correct.

A step-by-step drawdown test procedure prepared using the above guidelines shall be submitted to BEI for approval prior to its implementation.



### **6.3 WELL DECOMMISSIONING**

#### **6.3.1 General**

The well removal method used to decommission a well shall be determined by BEI. Decommissioning methods are presented below.

#### **6.3.2 Overdrilling**

##### **Open-Hole Well in Bedrock**

Open-hole wells have no well casing, sand pack, or bentonite seal installed inside the bedrock borehole; however, overlying unconsolidated deposits are usually cased off. Fill the hole in the bedrock with a sealing grout before beginning to overdrill the cased portion of the borehole. (If bedrock occurs at the land surface, no overdrilling is required.) The grout must be mixed and placed in accordance with the grouting procedures contained in Section 6.3.7. After the hole is grouted, overdrill the cased portion of the well in accordance with the overdrilling procedure presented below.

##### **Wells with a Confining Layer and Contamination**

If a confining layer and contamination are found to exist: (1) fill the well casing with grout to the top of the confining layer, and (2) overdrill the well in accordance with the overdrilling procedure below until 2 feet of the confining layer is penetrated. When overdrilling is completed, grout the borehole in accordance with the procedure contained in Section 6.3.7.

##### **Overdrilling Procedure**

The overdrilling operation shall:

1. Follow the original well bore
2. Create a borehole of a slightly larger diameter than the original boring
3. Remove all well construction materials

Acceptable methods for overdrilling include:

1. using an overreaming tool with a pilot bit that is nearly the same size as the inside diameter of the casing and a reaming bit that has a slightly larger diameter than the original borehole diameter (this method can be used for wells with steel casings)
2. using a hollow-stem auger equipped with outward-facing, carbide cutting teeth with a diameter minimum 4 inches larger than the casing. Use outward-facing cutting teeth so that the cutting tool does not sever the casing and drift off-center. Install a steel guide pipe inside the casing as required to ensure that the augers remain centered. When the full

diameter and length of the well have been penetrated, retrieve the casing and screen from the center of the auger in accordance with ASTM D 5299.

After overdrilling is completed, grout the borehole in accordance with the procedures contained in Section 6.3.7.

### **6.3.3 Casing Perforation**

Casing perforation consists of perforating the well casing and screen and grouting the well. This procedure should not be used for wells with inside diameters less than 4 inches. Provide a minimum of four rows of perforations several inches long and a minimum of five perforations per linear foot of casing or screen in accordance with ASTM D 5299.

After perforating is completed, grout the borehole in accordance with the procedures contained in Section 6.3.7.

### **6.3.4 Casing Pulling**

Remove the casing by the following procedure:

1. puncture the bottom of the casing
2. fill the casing with grout tremied from the bottom of the well
3. use jacks to free casing from the hole
4. lift the casing out by using a drill rig, backhoe, crane, or other suitable equipment of sufficient capacity. Place additional grout as required as the casing is withdrawn. Grout mixing and placement shall be in accordance with Section 6.3.7.

PVC casings may not be able to be removed by pulling in certain conditions. Excessive deformation or breakage of the well casing may preclude removal by pulling deep wells in extremely cohesive soils. Pulling of PVC casings by this procedure shall be reviewed and approved by BEI before the pulling operation begins.

### **6.3.5 Grouting the Casing In-Place**

Fill the casing with grout in accordance with Section 6.3.7 to a level of approximately 5 feet below the land surface. Cut the well casing at a depth of 5 feet below the land surface, and remove the casing and associated well materials from the ground.

### **6.3.6 Removing the Protective Casing**

#### **Before Sealing the Well**

When overdrilling or casing pulling is required, the protective casing shall be removed first, unless the drilling tools used to overdrill the well have an inside diameter larger than the protective casing. The removal of the protective casing shall not break the well casing off below ground or allow foreign material to enter the well casing.

To remove the casing, break up the concrete seal surrounding the casing, and jack or hoist the casing out of the ground. Verify that the inner well casing is not being pulled up with the protective casing. If this occurs, cut off the well casing above ground after the base of the protective casing is lifted above the land surface.

#### **After Sealing the Well**

When grouting the well casing in-place is required, the protective casing may be removed after the well has been filled to a depth of 5 ft below the land surface. The upper 5 feet of casing and the protective casing may be removed in one operation if a casing cutter is used. If the height of the protective casing makes working conditions at the well awkward, the casing may be cut off at a lower level as long as the inner well casing remains above ground and is not damaged such that the well is prevented from being filled with grout.

### **6.3.7 Selecting, Mixing, and Placing Grout**

#### **Standard Mixture**

Unless a special mixture is required, as stated in the mixing procedure below, the following standard mixture shall be used for all boreholes:

- One 94-pound bag of type I Portland cement
- 5.6 pounds of powdered bentonite
- 9.1 gallons of potable water

#### **Special Mixture**

In cases where excessive use of grout is anticipated, such as in high-permeability formations and highly fractured or cavernous bedrock formations, the following special mixture shall be used:

- One 94-pound bag of type I Portland cement
- 5.6 pounds of powdered bentonite
- 6 to 9 gallons of potable water (depending on desired thickness)

The minimum amount of water that can be added for the mixture to be readily pumpable is 6 gallons per 94-pound bag of cement.

#### Mixing Procedure

1. Calculate the volume of grout required to fill the borehole before beginning to mix the grout.
2. Mix the grout until a smooth, homogeneous mixture is achieved. No lumps or dry clots should be present. Grout can be mixed manually or with a mechanized mixer such as a vertical paddle grout mixer. Colloidal mixers shall not be used.

#### Placement

Grout shall be placed in the borehole from the bottom to the top by using a tremie pipe of not less than 1-inch diameter. Grout shall then be pumped into the borehole at a rate of 5 to 10 gpm until the grout appears at the land surface or to 5 ft below land surface when grouting casing is in place. When grouting an open hole in bedrock, the grout level must reach above the bedrock surface. In wells where screen and casing are pulled from the borehole, the removed casing or augers shall be removed from the hole after the grout level stabilizes. As each section is removed, grout shall be added to keep the level just below the land surface. If the grout level cannot be maintained near the land surface, grout in stages, such that the first batch of grout is allowed to partially cure before a second batch of grout is added. Upon completion of grouting, verify that the final grout level is approximately 5 feet below land surface. A ferrous metal marker shall be embedded in the top of the grout to indicate the location of the former monitoring well.

#### 6.3.8 Backfilling and Site Restoration

The uppermost 5 feet of the borehole at the land surface shall be filled with materials appropriate to the intended use of the land and physically similar to the natural soils. The surface of the borehole shall be restored to the condition of the surrounding area. All solid waste materials generated during the decommissioning process shall be disposed of as stated in Section 6.4.

#### 6.4 WASTE DISPOSAL

Soil cuttings drilled from each borehole, shall be disposed of by the Subcontractor by placing onto plastic sheeting or other material approved by BEI. The soil cuttings will then be placed into 55-gallon UN1A2 steel drums (49 CFR 173) provided by the Subcontractor. Discharge water shall be conveyed to UN1A1 steel drums (49 CFR 173). Used plastic sheeting and contaminated personal protective equipment shall be containerized in 55-gallon UN1A2 steel drums (49 CFR 173). The lids of all drums will be tightly secured by the Subcontractor. The Subcontractor shall mark each drum as to its contents, drill hole or well identification number, depth interval represented by the spoils, and the date. Drums shall be filled with all waste

generated by these operations and loaded, hauled, unloaded and placed at locations onsite as designated by BEI.

## 6.5 CLEANUP

The drilling locations and work areas shall be kept in a neat and orderly condition at all times. Cleanup includes but is not limited to the following:

- removal from the site of all uncontaminated equipment, trash, waste, and materials used in connection with the work
- decontamination of contaminated equipment and materials, which shall not be removed from the site until certified for release by BEI.
- placement of contaminated items, which cannot be decontaminated as determined by BEI, at locations onsite as designated by BEI.
- site restoration to a condition similar to that found before the work commenced.
- verification that all areas damaged or disturbed by the Subcontractor have been leveled, graded to drain, seeded, fertilized, and reseeded as necessary to establish turf for erosion control.

## **APPENDIX D**

# **TECHNICAL SPECIFICATION FOR CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION**


DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

1	1/9/95	Revised to CSI format and Section 3.8	KK	GAC	ME	JRM
0	7/21/94	Issued for use	KK	RTJ	PH	RBB
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				001-SF000-005		1
				SHEET 1 OF 10		

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## **PART 1 GENERAL**

### **1.1 SCOPE**

This Specification provides the technical requirements for the excavation of contaminated material and miscellaneous demolition. Not all work defined herein is necessarily required; reference is directed to the Scope of Work and engineering drawings for specific services required.

### **1.2 WORK INCLUDED**

- 1.2.1 Furnishing labor, materials, tools and equipment.
- 1.2.2 Installing and maintaining dust, sediment and erosion control.
- 1.2.3 Demolishing existing concrete and asphalt surfaces.
- 1.2.4 Providing shoring as needed.
- 1.2.5 Securing area (temporary barriers) as needed.
- 1.2.6 Excavating contaminated material.
- 1.2.7 Decontaminating subcontractor-supplied equipment.

### **1.3 WORK NOT INCLUDED**

- 1.3.1 Establishing limits of excavation.
- 1.3.2 Sampling and testing excavated material.
- 1.3.3 Backfilling
- 1.3.4 Treating contaminated material.
- 1.3.5 Loading and transporting contaminated material.
- 1.3.6 Clearing and grubbing is included in Technical Specification 001-SP000-002.
- 1.3.7 Operations of decontamination facility, other than that required for subcontractor equipment decontamination.

1.3.8 Temporary storage/placement of contaminated material.

1.3.9 Disposal of decontamination water.

#### 1.4 REFERENCED CODES AND STANDARDS

Unless otherwise specified or shown, the latest edition at the time of bid of the following Codes and Standards shall apply to the extent indicated herein:

##### OCCUPATIONAL SAFETY AND HEALTH (OSHA)

29 CFR 1910 Occupational Safety and Health Regulations for General Industry

29 CFR 1926 Occupational Safety and Health Regulations for Construction

The Subcontractor shall comply with all federal, state, local, and facility codes and standards applicable to the propose work.

#### 1.5 SUBMITTALS

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F (Attachment A), "Subcontractor Submittal Requirements Summary" (SSRS), shall apply. Submittals identified shall meet the detailed requirements defined herein. Bechtel will determine if documentation is complete as submitted and reserves the right to require the resubmittal of any submittals that do not meet specified requirements.

##### 1.5.1 Equipment List

Submit list of equipment for use in contaminated earthwork. The list shall include the type, size, and rated capacity of the equipment proposed.

##### 1.5.2 Drainage, Dewatering, and Stream Diversion Design

Submit proposed drainage, dewatering, and stream diversion design prior to construction not indicated on engineering drawings. Design shall be signed and stamped by a Professional Engineer licensed in the state where the work is performed.

### **1.5.3 Shoring Design and Calculations**

Submit proposed shoring design and engineering calculations or alternate slope protection measures in accordance with Subpart P, OSHA 29 CFR 1926. Design shall be signed and stamped by a Professional Engineer licensed in the state where the work is performed.

### **1.5.4 Excavation Daily Inspections**

Submit daily inspections of the excavation areas in accordance with OSHA 29 CFR 1910 and 1926 prior to commencing work each day.

### **1.5.5 Shoring Inspector**

Submit name and resume of the shoring inspector to be provided for bid evaluation. Inspector shall be qualified in accordance with OSHA 29 CFR 1926, Subpart P.

### **1.5.6 Professional Engineer's License**

Submit copy of Professional Engineer's license for bid evaluation (for the state where work is performed) of Professional Engineer(s) used for the shoring and drainage designs.

### **1.5.7 Alternate Methods**

Submit copy of alternate shoring method when applicable at least one week prior to use. Design shall be signed and stamped by a Professional Engineer licensed in the state where the work is performed.

### **1.5.8 Temporary Decontamination Facility Plan**

Submit plans for a temporary decontamination facility at least one week prior to mobilization.

### **1.5.9 Sediment Barriers**

Submit copy of materials and plan for sediment barriers prior to use.

### **1.5.10 Erosion Control Blankets**

Submit product data sheet for erosion control blankets prior to use.

## 1.6 QUALITY STANDARDS

Perform the work and control the quality of items and services to meet the requirements of this specification, subcontract documents, and applicable codes and standards.

## PART 2 PRODUCTS

### 2.1 SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of straw bales, hay bales, geotextile filter fabric made expressly for use as a silt screen, or other materials approved by Bechtel prior to their use. Straw and hay bales shall not be used for permanent sediment barriers unless approved by Bechtel.

- 2.1.1 Baled hay or straw shall be laid end to end such that no gap exists between bales. Reinforcing bars shall be #4 bar and a minimum of 2½ feet long.
- 2.1.2 Filter fabric shall be a material made expressly for the purpose of sediment control such as Exxon GTF 101S Silt Screen or approved equal.

### 2.2 EROSION CONTROL BLANKETS

Erosion control blankets shall be Curlex Blankets manufactured by American Excelsior Company or approved equal.

## PART 3 EXECUTION

### 3.1 PRE-EARTHWORK EVALUATION

Prior to performing any earthwork, examine the work area if possible depending on the site conditions as determined by Bechtel, to identify pre-existing conditions (e.g. overhead power lines, access, etc.) that could impact the performance and completion of work. Bechtel will provide available information on the location of underground utilities. Verify these locations, provide structural support to utility lines, and coordinate inspection with and provide support to utility companies. Unless directed otherwise, the services of all underground utilities encountered during any earthwork shall be restored to their original condition. Applicable permits shall be obtained prior to commencing work unless directed otherwise.

### 3.2 EROSION AND SEDIMENT CONTROL

- 3.2.1 Potentially contaminated material shall be prevented from being eroded or transported into an uncontaminated area or an area with a lower level of contamination.

- 3.2.2 Temporary sediment barriers shall be installed in accordance with the subcontract documents and maintained during construction until permanent sediment barriers are in place.
- 3.2.3 Erosion and sediment shall be controlled by the following techniques subject to Bechtel review on a case-by-case basis:
- covering with synthetic liner material
  - covering with uncontaminated soil material
  - sediment barriers

### 3.3 DUST CONTROL

Dust shall be controlled by the following techniques subject to Bechtel review on a case-by-case basis:

- wetting with water
- wetting with a synthetic dust suppressant
- establishing temporary vegetative cover compaction
- sealing by rolling with a smooth drum
- maintaining slopes of exposed surfaces within defined limits

### 3.4 DRAINAGE, DEWATERING, AND STREAM DIVERSION

#### 3.4.1 Drainage

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grading shall be developed and maintained during construction.

Excavated slopes and backfill surfaces shall have a minimum 3 percent slope to promote runoff and shall be protected from erosion and sloughing. Excavation slopes shall conform to Subpart P, "Excavation, Trenching, and Shoring," of OSHA 29 CFR 1926.

#### 3.4.2 Dewatering

Unless noted otherwise, all excavations shall be kept in a dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave in the excavation; and to eliminate any interference with excavation progress. Water, which has come in contact with contaminated material, shall be collected and transported to an offsite location, which is not within the scope of this specification.

### 3.4.3 Stream Diversion

Stream diversion(s) shall be developed as shown on the engineering drawings or Scope of Work, and maintained to prevent the spread of contamination.

## 3.5 BLASTING

Blasting is not permitted.

## 3.6 EXCAVATION

### 3.6.1 General

Excavation shall conform to the lines, grades, and depths identified on the engineering drawings or Scope of Work, and field-verified by Bechtel. Excavated areas shall be maintained in a clean condition, free from leaves, brush, trash and other debris. They shall be inspected and documented daily in accordance with OSHA 29 CFR 1910 and 1926 prior to commencing work.

Rocks, 6 inches or greater in any dimension, shall be separated from the soil and cleaned of most soil material by scrapers, brushes, etc. These rocks shall be left in the excavation area.

### 3.6.2 Contamination Control

Excavation shall be performed such that the spread of contamination is prevented. Unless indicated otherwise, the cutting edge of the excavator(s) shall be toothless and the excavation performed in the direction of surface run-off (i.e., from high to lower elevation). Contamination spread through the improper execution of the subcontract documents shall be cleaned up to the satisfaction of Bechtel at no expense to Bechtel.

### 3.6.3 Shoring

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled to prevent cave-ins. Alternate methods (e.g. benching, sloping, trench boxes, etc.) may be used where applicable. They shall be developed in accordance with OSHA 29 CFR 1926, Subpart P.

Care shall be taken to minimize exposure of shoring or other slope protection devices to contamination. These items shall not be released from the site until they have been decontaminated in accordance with this specification.

### 3.6.4 Excavation Sequence

The sequence for the excavation of contaminated material shall be as follows:

- (1) Define and isolate exclusion zones identified on the engineering drawings, Scope of Work, or as directed by Bechtel.
- (2) Construct haul road identified on the engineering drawings, Scope of Work or as directed by Bechtel.
- (3) Perform initial excavation to the lines and grades identified on the engineering drawings, Scope of Work or as directed by Bechtel.
- (4) Allow excavated area to be sampled to determine if the area meets remedial cleanup standards.
- (5) Continue excavation as directed by Bechtel. Allow area to be resampled after each lift of material is removed.
- (6) Cease excavation upon direction by Bechtel.

### 3.7 DEMOLITION OF CONCRETE AND ASPHALT SURFACES

- 3.7.1 Demolition shall consist of demolishing, rubblizing, scabbling and/or disposing of asphalt, concrete, or bituminous concrete surfaces within the limits to be excavated as identified on the engineering drawings, Scope of Work and/or as directed by Bechtel.
- 3.7.2 Construction joints shall be saw cut in existing concrete or asphalt, where new concrete or asphalt will be placed.
- 3.7.3 Reinforcing bars encountered during concrete removal shall be cut with a method approved by Bechtel.
- 3.7.4 Daily inspections shall be performed in accordance with OSHA 29 CFR 1910 and 1926 when fuel powered tools are used indoors. Inspections shall include the review and documentation of administrative and engineering controls and measurement of air quality in confined spaces. No personnel shall enter the work area until required corrective measures are completed.

### 3.8 EQUIPMENT DECONTAMINATION

- 3.8.1 The equipment decontamination facility shall have a 30-mil plastic liner and be bermed to provide containment of decontamination water.
- 3.8.2 All equipment and tools used in contaminated areas shall be decontaminated to remove all adhering dirt and mud.
- 3.8.3 Authorization shall be obtained from Bechtel before entering or exiting the decontamination facility.
- 3.8.4 Bechtel is not responsible for the operations of the decontamination facility.
- 3.8.5 Equipment that has been in contaminated areas shall be decontaminated. The decontamination facility shall be used only for light and final decontamination and not for operations that would require gross decontamination (i.e., removal of most visible materials by scrapers, brushes, etc). Gross decontamination, if required, shall be performed as part of the specified earthwork at the area where trucks are loaded or unloaded. Decontamination shall be repeated as required. Following decontamination, all equipment shall be made available for inspection by Bechtel. Equipment shall be cleaned to the satisfaction of Bechtel.
- 3.8.6 Written approval from Bechtel shall be obtained prior to removing equipment from the site.
- 3.8.7 The decontamination water shall be containerized in 55-gallon drums, which is not within the scope of this specification.

### 3.9 PROTECTION OF WORK

Settlement or erosion that occurs in compacted materials prior to acceptance of the work shall be repaired to required conditions at no expense to Bechtel.

### 3.10 SECURITY

Work areas shall be secured using barriers (e.g., rope, snow fence) to prevent inadvertent entry to work areas as determined by Bechtel.



**APPENDIX E**

**TECHNICAL SPECIFICATION FOR  
TRANSPORTATION OF CONTAMINATED MATERIALS**


DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

TRANSPORTATION OF CONTAMINATED MATERIALS

1	10/6/94	Revised Notice to Transporter Concerning Lead Time	<i>J.D.</i>	<i>KCN</i>	<i>KCN</i>	<i>JRM</i>
0	8/2/94	Issued for Use	KCN			
No.	Date	REASON FOR REVISION	BY	CHECK	SUPV	PE
		Transportation of Contaminated Material	JOB NO. 22567			
			TECHNICAL SPECIFICATION		REV.	
			001-SP000-003		1	
			SHEET 1 OF 20			

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**TECHNICAL SPECIFICATIONS  
FOR  
TRANSPORTATION OF CONTAMINATED MATERIALS**

**1.0 GENERAL**

**1.1 PURPOSE**

This Specification addresses requirements and conditions that apply to transportation of hazardous material(s) (HM), hazardous waste(s) (HW), and contaminated material(s) (CM) at U.S. Department of Navy sites under the Naval Facilities Engineering Command, Southern Division. The Subcontractor, Common Motor Carrier (if different), and motor vehicle operator(s) shall be knowledgeable of and comply with Federal Department of Transportation (DOT) regulations (49 CFR), and Environmental Protection Agency (EPA) regulations (40 CFR). Not all transport operations defined herein may be required. Reference is directed to applicable Subcontract Scope of Work and Design Drawings for specific services required.

**1.2 ABBREVIATIONS**

The abbreviations listed below, when used in this Specification, have the following meanings:

AAR	Association of American Railroads
BEI	Bechtel Environmental, Inc.
CDL	Commercial Driver's License
CFR	Code of Federal Regulations
CM	Contaminated Material
COFC	Container on flat car
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HM	Hazardous Material
HW	Hazardous Waste
ICC	Interstate Commerce Commission
ISO	International Standards Organization
LSA	Low Specific Activity
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
RQ	Reportable quantity
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage, and Disposal Facility

### 1.3 QUALITY STANDARDS

The quality standards, as defined by Bechtel Environmental, Inc. (BEI) and Federal DOT and EPA regulations [i.e., Code of Federal Regulations (CFRs)] applicable to this Specification are identified herein and are applicable directly or indirectly to:

- roll-on/roll-off bimodal containers
- transporting vehicle (also referred to as motor vehicle)
- rail cars (flat, box, gondola)
- equipment and material
- packaging, labeling, marking, placarding, handling, and transporting of HM, HW, and CM
- qualifications of Subcontractor provided personnel.

The following CFRs, which are a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government, are identified in this Specification for the purpose of quality standards. Failure to identify an applicable CFR does not imply elimination of required Subcontractor knowledge and compliance.

Title	No.	CFR Regulations Title
	40	262 "Standards Applicable to Generators of Hazardous Waste"
	40	263 "Standards Applicable to Transporters of Hazardous Waste"
	40	761 "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"
	49	171 "General Information, Regulations and Definitions"
	49	172 "Hazardous Materials Table, Special Provisions, Communications, Emergency Response Information and Training Requirements"
	49	173 "Shippers - General Requirements for Shipments and Packagings"
	49	174 "Carriage by Rail"
	49	177 "Carriage by Public Highway"
	49	178 "Specifications for Packagings"
	49	215 "Railroad Freight Car Safety Standards"
	49	383 "Commercial Driver's License Standards; Requirements and Penalties"
	49	385 "Safety and Fitness"
	49	387 "Minimum Levels of Financial Responsibility for Motor Carriers"
	49	391 "Qualifications of Drivers"

Title	No.	CFR Regulations Title
49	392	"Driving of Motor Vehicles"
49	393	"Parts and Accessories Necessary for Safe Operation"
49	395	"Hours of Service of Drivers"
49	396	"Inspection, Repair, and Maintenance"
49	397	"Transportation of Hazardous Materials; Driving and Parking Rules"
49	1300	"Passenger and Freight Tariffs and Schedules (of Subtitle B, "Other Regulations Relating to Transportation"; Subchapter D, "Tariffs and Schedules")"

Quality, where standards are not identified in this Specification, will be reviewed by BEI for approval on a case-by-case basis. Replacement of material, equipment, or personnel (including time lost) due to failure to meet the Subcontract specified quality standards, or BEI approval when standards are not identified, shall be at the Subcontractor's expense. When requested, and at no cost to BEI, the Subcontractor shall provide material samples, manufacturer specifications, and documentation in support of quality standards.

#### 1.4 EQUIPMENT, MATERIAL, AND PERSONNEL REQUIRED

Equipment, material, and personnel provided to BEI by the Subcontractor shall be as follows:

##### 1.4.1 Transportation by Highway

- Transport vehicles (e.g., dry van, flatbed, roll-off, lowboy, and ocean style trailers; truck tractors; and roll-off and ocean style containers) that meet the requirements of Title 49 CFR 393 and 396.
- Securement systems, especially tiedown assemblies (e.g., chains, cables, steel straps, and fiber webbing); load binders and hardware (e.g., hooks, bolts, welds, or other connectors); and winches or other fastening devices that are without visual damage from wear or misuse and that meet the requirements of Title 49 CFR 393, Subpart I.
- Weatherproof tarpaulins that are without visual damage from wear or misuse and of a quality highly resistant to tears, rips, snags, punctures, abrasion, cracking, peeling, weathering, and that are suitable for use as an external cargo wrap.
- Side boards that are suitable as a frame for use with tarpaulins to form a closed transport vehicle.
- Motor vehicle operators who meet the requirements of Title 49 CFR 383, 391, 392, 395, 397, and 172 Subpart H, and 177. A signed affidavit stating that all vehicle operators handling Navy

waste are HAZMAT trained in accordance with 49 CFR Part 172, Subpart H; and an outline of the course program may be submitted.

#### **1.4.2 Roll-On/Roll-Off Bimodal Containers**

##### **Delivery**

The Subcontractor shall deliver to Navy job sites roll-on/roll-off bimodal containers for BEI use. BEI will order containers through use of work releases which identify the job site, delivery rate (e.g., two per day), and the date of the first delivery. Every effort will be made by BEI to give at least 10 work days of advance notice to the Subcontractor; however, some instances may occur where only 2 days notice will be provided.

##### **Design, Construction, and Testing**

All Subcontractor roll-on/roll-off bimodal containers provided for BEI use shall be designed, constructed, and tested in accordance with the Association of American Railroads (AAR) Specification M-930-90 and shall be capable of meeting the DOT requirements as a strong-tight container. Each container offered to BEI shall be identified with a certification plate as prescribed in Section 6.13 of AAR Specification M-930-90. The Subcontractor shall provide BEI with a drawing of the roll-on/roll-off bimodal container that displays the materials of construction, door closure and fastener details, and hold down and lifting pad details.

##### **Size of Roll-On/Roll-Off Bimodal Containers**

The roll-on/roll-off bimodal container to be provided by the Subcontractor shall be either 20 cubic yard or 25.5 cubic yard capacity. Quantity and identification of container size shall be identified in the work release. The Subcontractor shall provide BEI, on the same drawing identified in 1.4.2.2, the external and internal dimensions and the tare weight and gross weight rating of the container.

##### **Condition of Containers**

At the time of delivery, the Subcontractor shall provide containers janitorially clean (broom clean), free of extraneous debris, and free of excess scale and corrosion which could be an impediment to decontamination in the event the containers should become contaminated.

##### **Liners**

The Subcontractor shall provide polyethylene bag liners that have a polyethylene nominal thickness of at least 6 mils. The polyethylene used in fabrication of the liner shall be prime virgin resins. The bag liner shall be fabricated to fit squarely in the corners to virtually eliminate tearing on filling and shall be watertight. The Subcontractor shall provide manufacturer's data sheets and certifications that bag liners provided meet the Specification's requirements.

Alternate materials and thicknesses for the liner may be offered by the Subcontractor, but the proposed change must be approved in advance by BEI as an equivalent bag liner.

The Subcontractor shall provide written procedures for the bag liner installation and proper assembly of roll-on/roll-off bimodal containers to meet DOT requirements as strong-tight containers during transport.

### **1.4.3 Rail Freight Cars and Siding Requirements**

#### **Defects and Restrictions**

The Subcontractor shall provide BEI with rail freight cars consisting of mainly gondola cars, some flat cars, and a few box cars. All rail freight shall be in good order and shall contain no defects in accordance with 49 CFR Part 215, Subpart B, or any restrictions at time of delivery as defined in 49 CFR Part 215, Subpart C.

#### **Freight Car Load Ratings**

The Subcontractor shall provide rail freight cars having a load capacity of not less than 75 tons nor more than 100 tons. The ratings of the rail gondola cars shall be mainly 95- and 100-ton cars. Written approval, in advance, shall be obtained from BEI in order to supply rail gondola cars having a load capacity rating of less than 90 tons.

#### **Qualification of Rail Transportation Crew**

All Subcontractor personnel who handle and process BEI loaded rail freight cars and intermodal packages shall be HAZMAT trained in accordance with 49 CFR 172.700, Subpart H. A signed affidavit stating that all railroad crew members handling rail freight cars containing Navy waste are HAZMAT trained and an outline of the course program may be submitted.

#### **Freight Car Cleanliness**

The rail freight cars provided by the Subcontractor shall be free of loose debris and be janitorially clean (broom clean).

#### **Rail Gondola Car**

The Subcontractor shall provide to BEI rail gondola cars that are free of internal appurtenances which could affect the integrity of sift-proof liners that BEI will provide and install.

The Subcontractor-provided rail gondola cars shall have an internal height of not less than 4.5 feet nor greater than 5.75 feet.



The Subcontractor shall provide cars whose internal surfaces, in BEI's opinion, are free of major rust or scale which could affect the ability to easily decontaminate the car in the event it became contaminated.

### **Rail Siding Maintenance**

Subcontractor provided rail sidings (i.e., frogs, switches, ballast, crossties, rails, fastenings) shall be maintained to at least a Class 1 standard throughout any shipping campaign in accordance with 49 CFR Part 213. The Subcontractor shall notify BEI in writing of the names and qualifications of persons designated to inspect track.

## **1.5 PACKAGING, LABELING, MARKING, AND PLACARDING**

### **1.5.1 Transportation by Highway**

Packaging, labeling, marking, and placarding will be performed by BEI [or Treatment, Storage, and Disposal Facility (TSDF)] in compliance with Title 49 CFR 172, 173, 178, and Title 40 CFR 262, 263, and 761. The motor vehicle operator(s) shall perform an inspection to verify, based on his training in accordance with Title 49 CFR 172, Subpart H, and experience, the packaging, labeling, marking, and placarding are in accordance with the requirements listed above and the accompanying shipping documents. Upon acceptance of the load for transport, the Subcontractor shall be responsible for maintaining the integrity of BEI's packaging, labeling, marking, placarding, and the accompanying shipping documents in compliance with 49 CFR 177.800, Subpart A. BEI shall be notified immediately (see Section 6.0, Accidents Involving Transport Vehicles, for notification procedures) upon the Subcontractor's discovery of a change in the condition of BEI's packaging, labeling, marking, or placarding (e.g., changes due to equipment failure, packaging failure, accident, adverse weather conditions, vandalism, or theft). Concerns or questions related to the inspection, maintenance, or notification procedures are to be addressed to the BEI site manager or his designee prior to the motor vehicle operator's load acceptance.

### **1.5.2 Roll-On/Roll-Off Bimodal Containers**

BEI will inspect the roll-on/roll-off bimodal container in accordance with the Specification at the time of Subcontractor delivery and, upon acceptance, will direct where to place the container.

BEI may elect to survey the roll-on/roll-off bimodal container at the time of delivery for the presence of hazardous materials. BEI will install the Subcontractor provided bag liner, fill the container, and seal it for shipment in accordance with Subcontract provided packaging procedures. BEI will mark, label, placard, certify the packaging, and prepare required shipping documents in accordance with DOT requirements.

### 1.5.3 Rail Freight Cars

BEI will offer strong-tight packages to be used for packaging of some waste. These packages will be designed to meet AAR Specification M-930-90, "Closed Van-Type Dry Cargo Containers for Domestic Container-on-Flat-Car (COFC) Service." BEI will mark, label, certify, and provide shipping papers describing the packaged container contents in full compliance with 49 CFR Parts 171, 172, and 173. These containers will be turned over to the Subcontractor for loading and shipment.

Schedule adjustments shall be made by BEI, when needed, that result from weather conditions that prevent loading of Navy waste into or onto rail freight cars. The BEI Site Superintendent or designee will notify the Subcontractor of all necessary schedule adjustments due to inclement weather.

The Subcontractor shall provide equipment, such as but not limited to, clevis, slings, cranes and bridges, lifting and handling procedures, training of workers and supervision in order to transfer BEI packages to rail flat cars and to provide blocking, bracing, and load securement for the packages such that the packages will not move or fall during conditions normally incident to transportation.

The Subcontractor shall provide BEI copies of the latest certification of load testing of all lifting equipment used for COFC services for BEI packages. The Subcontractor shall also provide BEI with copies of each load test of the equipment and reason for load test (e.g., maintenance repair, periodic retest).

BEI shall placard the rail freight cars and intermodal packages in accordance with 49 CFR Part 172, Subpart F. Subcontractor rail crew members shall replace placards and car certificates that become lost in transit at the next inspection point in accordance with 49 CFR Part 174.59.

## 2.0 MOTOR VEHICLE REQUIREMENTS

### 2.1 GENERAL

The Subcontractor shall provide equipment that is appropriate to accomplish successful transportation of HM, HW, or CM either from Navy sites or to or from the TSDF. Motor vehicles shall be maintained and operated in accordance with the manufacturer's recommendations, Occupational Safety and Health Administration (OSHA) requirements, federal regulations as specified in Title 49 CFR 393, 396, and 397, and applicable state and local regulations. The Subcontractor shall take all precautions necessary for safe operation of his equipment/vehicle and to safeguard the public and the environment from injury or accidental release of HM, HW, or CM.

The Subcontractor shall provide to BEI a list of the transport vehicles to be used, broken down by identification number, type, and size.

## 2.2 MOTOR VEHICLE INSPECTIONS

All vehicles shall be inspected by the Subcontractor in accordance to Title 49 CFR 393, "Parts and Accessories Necessary for Safe Operation," and shall conform to all applicable local, state, and federal requirements for registration, insurance, inspection, certification, and performance.

All motor vehicle inspections shall be performed by qualified inspectors as required by Title 49 CFR 396.19, "Inspector Qualifications." The Subcontractor shall submit a copy of the current certificate of commercial motor vehicle inspection and the inspector's certificate of training to BEI prior to any transportation activities (or may provide a statement certifying that all motor vehicles supplied to BEI have been inspected in accordance with the requirements of Title 49 CFR 396.17, 396.19, and 396.23).

Brake inspections shall be performed by a certified brake inspector for commercial motor vehicles as described in Title 49 CFR 396.25, "Qualifications of Brake Inspectors." The Subcontractor shall submit a copy of the current certificate of brake inspection and the inspector's certification of training to BEI prior to transportation activities (or may provide a statement certifying that all motor vehicles supplied to BEI have been inspected in accordance with the requirements of Title 49 CFR 396).

Prior to being placed into use, and at least once each day, in accordance with the requirements of Title 49 CFR 396.11, "Driver Vehicle Inspection Report," and 396.13, "Driver Inspection," the motor vehicle operator shall perform a safety inspection of the motor vehicle. The vehicle operator upon arrival, shall provide BEI with a copy of the current signed daily safety inspection report. BEI will confirm that the transporting vehicle has been inspected in accordance with 49 CFR 396, "Inspection, Repair, and Maintenance."

All motor vehicles (and equipment) provided to BEI shall be subject to a quality surveillance by BEI prior to loading to determine that the motor vehicle (and equipment) in accordance with Title 49 CFR 393 and 396. Such inspection and approval shall not relieve the Subcontractor of responsibility for the use of proper equipment. **INSPECTION OF VEHICLES BY BEI DOES NOT IMPLY CERTIFICATION.** The Subcontractor shall allow six hours for motor vehicle inspection, loading/unloading, and release from a BEI site (or TSDF).

Motor vehicles determined by BEI to be potentially unsafe and/or unsuitable for their intended use shall be removed from the site until repaired by the Subcontractor at his expense or replaced with a different motor vehicle. Repaired or replaced motor vehicles will receive new inspections to determine if repairs are correct and meet inspection standards. Time lost due to reinspection shall be at the Subcontractor's expense.

### 3.0 MOTOR VEHICLE OPERATOR REQUIREMENTS

#### 3.1 QUALIFICATION OF MOTOR VEHICLE REQUIREMENTS

Before transportation services are rendered, motor vehicle operators (drivers) shall meet the requirements, including all required endorsements (and shall provide evidence of such) specified in Title 49 CFR 383, "Commercial Driver's License Standards: Requirements and Penalties"; 391, "Qualifications of Drivers"; and 172, Subpart H, "Training."

The following information must be submitted to BEI prior to any transportation activity:

- A medical examiner's certificate, or a legible photographic copy of a certificate, or a statement attesting to a record on file with the Subcontractor of a medical examiner's certificate on each motor vehicle operator's physical qualifications to operate a motor vehicle in accordance with Title 49 CFR 391.43, "Medical examination; Certification of Physical Examination," and Title 49 CFR 391.41, "Physical Qualifications for Drivers."
- A statement certifying the Subcontractor, at least once every 12 months, reviews the driving record of each motor vehicle operator it employs in accordance with Title 49 CFR 391.25, "Annual Review of Driving Record." Included in this review shall be a list of all violations of motor vehicle traffic laws in accordance with Title 49 CFR 391.27, "Record of Violations."
- A valid commercial driver's license (CDL) for each motor vehicle operator provided to BEI (and a legible photographic copy of the CDL to be retained by BEI).

#### 3.2 MOTOR VEHICLE OPERATORS NOT QUALIFIED

Motor vehicle operators may not be deemed qualified or acceptable in accordance with Title 49 CFR 391.51, "Disqualification of Drivers." Motor vehicle operators deemed not acceptable for transporting HW, HM, or CM shall be replaced at Subcontractor's expense, including time lost.

### 4.0 OTHER REQUIREMENTS

#### 4.1 MOTOR VEHICLE WEIGHT REQUIREMENTS

Prior to arrival for loading, all Subcontractor motor vehicles provided to BEI, shall be weighed at an offsite certified (certified calibrated) scale. Upon arrival for loading, each vehicle operator shall provide BEI a legible copy of the certified tare (light) weight receipt for that motor vehicle.

Prior to releasing the loaded motor vehicle for transport, BEI will verify motor vehicle and load weight by requiring all loaded motor vehicles (truck, trailer, and load) to be weighed at an offsite certified scale located within 30 miles of the Navy site. The Subcontractor shall provide BEI with a legible copy of the certified loaded weight receipt for each motor vehicle.

BEI will only accept certified tare and loaded weight receipts containing the following information:

- Motor Vehicle identification number
- Date motor vehicle was weighed
- Name, address, and telephone number of offsite certified scale
- Weigh master's signature

Gross weight of loaded motor vehicles (tractor, trailer, and load) released from the site(s) shall not exceed 80,000 pounds (except for BEI authorized permitted over-dimension/over-weight shipments). If a motor vehicle (tractor, trailer, and load) exceeds 80,000 pounds, or the maximum axle weight limits, the motor vehicle is to return to the site to off-load the excess weight.

#### 4.2 TRANSPORTATION SAFETY RATING

The Subcontractor shall submit to BEI a current copy of his Federal Motor Carrier Safety Rating assigned by the Federal Highway Administration (FHWA) as set forth in Title 49 CFR 385, "Determination of Safety Rating." A Subcontractor receiving notification by the FHWA of a "conditional" or "unsatisfactory" rating will be ineligible to transport HM, HW, or CM for BEI.

#### 4.3 CONTROLLED SUBSTANCE TESTING

The Subcontractor shall submit to BEI proof of compliance with Title 49 CFR 391, Subpart H, "Controlled Substance Testing." (The Subcontractor may provide an affidavit attesting that in compliance with Title 49 CFR 391, Subpart H, a controlled substance testing program is in place with a copy of the program available to BEI by request.)

#### 4.4 TRANSPORTER EPA ID NUMBER

The Subcontractor shall submit to BEI his EPA ID number and the EPA ID numbers of each railroad it is subcontracting with, if applicable, as specified per the Toxic Substances Control Act (TSCA) or Resource Conservation and Recovery Act (RCRA). If polychlorinated biphenyls (PCBs) are being transported, the Subcontractor is also required to have submitted a separate "Notification of PCB Activity" Form 7710-53 to the EPA as required by Title 40 CFR 761.202 and 761.205. A legible copy shall be provided to BEI prior to BEI's release of the load.

#### 4.5 CARRIER SURETY BOND OR POLICIES OF INSURANCE

The Subcontractor shall submit to BEI proof of insurance on DOT Form MCS-82 or MCS-90, as required in Title 49 CFR 387.

#### 4.6 TRANSPORTATION REPRESENTATIVE

The Subcontractor shall designate a competent, authorized representative, acceptable to BEI, that is knowledgeable in DOT hazardous materials regulations to represent and act for the Subcontractor.

The Subcontractor shall inform BEI in writing of the name and address of such a representative. A background statements of the representative's qualifications, along with copies of training certificates or any other documented source of training or establishment of knowledge of the DOT hazardous materials regulations, shall be submitted to BEI in writing.

#### 4.7 REQUIRED PERMITS AND LICENSES

The Subcontractor shall obtain all required permits and/or licenses and shall make all required notifications for transporting HM, HW, or CM from Navy sites to the TSDF (or to another Navy site), including any over-dimension/over-weight permits and/or notifications. The Subcontractor shall submit to BEI a legible copy of all required permits, licenses, and/or notifications made (or the Subcontractor may provide an affidavit attesting that all permits, licenses, and/or notifications shall be obtained or made with copies available at BEI's request).

#### 4.8 DOCUMENTATION

The Subcontractor shall be responsible for all documents/shipping papers provided by BEI prior to shipment in accordance with 49 CFR 177.817 or 49 CFR 174.24, "Shipping Papers." The Subcontractor shall comply with the directions provided by BEI prior to shipment regarding documents/shipping papers. All documents/shipping papers shall be kept with BEI's shipments at all times. BEI documents will include the following when applicable:

- Signed Uniform Hazardous Waste Manifest/Bill of Lading
- Exclusive Use Control Instruction
- Vehicle Survey Release Form (completed at the site prior to vehicle release)
- TSDF specific forms
- Emergency Response Guide Information

A copy of the signed Bill of Lading, the Uniform Hazardous Waste Manifest (when required), and any TSDF specific forms shall be included with the Subcontractor's invoice for payment of transportation services.

#### 4.9 TRANSPORTATION ROUTES AND EMERGENCY RESPONSE PLAN

##### 4.9.1 Transportation by Highway

The Subcontractor shall meet all existing federal, state, and local regulations for traffic control and motor vehicle operation for transportation of HM, HW, or CM on public roads and highways.

The Subcontractor shall submit a written transportation Emergency Response Plan, which includes instructions for compliance with Title 49 CFR 171.15, "Immediate Notice of Certain Hazardous Materials Incidents," and 172, Subpart G, "Emergency Response Information." The plan shall include all aspects and considerations for HM, HW, or CM transportation hazards that may arise

during transportation operations, and shall be submitted to BEI for review ten working days prior to any waste hauling. The plan shall include, at a minimum:

- Procedures for incident response
- Methods to contain and clean up releases
- Details of manpower and equipment available
- The coordination necessary to mobilize the above forces in an emergency
- Traffic maintenance/warning procedures
- List of emergency numbers for information and notification on HM, HW, or CM for each applicable state
- Name of emergency response coordinator

The Subcontractor shall notify BEI immediately upon learning that a transportation-related accident has occurred as stated in Section 6.0, "ACCIDENTS INVOLVING TRANSPORT VEHICLES" of this Specification.

The Subcontractor shall be responsible for providing BEI with the proposed transportation route that is in compliance with Title 49 CFR 397, "Transportation of Hazardous Materials; Driving and Parking Rules [397.9, "Routes," and 397, Subpart D, "Routing of Class 7 (Radioactive) Materials"] to be used between the Navy site (or TSDF) and TSDF (or another Navy site) prior to transport. Except for authorized deviations due to city hazardous material by-pass routes or detours mandated by powers of authority (e.g., detours due to construction, emergency situations, or inclement weather conditions), deviations from the submitted routes are not permitted without prior written approval by BEI. Transportation routes may be shown on BEI Design Drawings, when drawings are provided.

The cleanup cost for any release of HM, HW, or CM by the Subcontractor shall be the responsibility of the Subcontractor. The cleanup operations shall be performed at the expense of the Subcontractor. Cleanup shall be performed immediately.

A shipment that is designated by BEI to be a RCRA HW will require the Subcontractor to submit to BEI a current EPA ID# as proof of being an EPA-approved transporter of RCRA waste.

#### 4.9.2 Railroad Routing Map

The subcontractor shall provide to BEI a map showing the proposed routing of rail freight cars from point of origin to the disposal facility. The routing map should identify all utilized railroads and indicate key milestones expressed in travel days from the time leaving the point of origin.

## 4.10 TRACKING AND NOTIFICATION

### 4.10.1 Transportation by Highway

The Subcontractor shall have in operation a satellite tracking system to be used on all BEI shipments. At least once a day, the motor vehicle/load shall be located with the time and location recorded. In conjunction with the satellite tracking system, the Subcontractor shall implement a procedure for daily contact with the motor vehicle operator. BEI will not consider messages forwarded, left with answering services, or on answering machines as daily contact. As an alternative, the Subcontractor may implement a scheduled daily telephone call-in/call-back location verification system and the call-in/call-back system require the Subcontractor to notify BEI immediately if the Subcontractor is unable to verify the motor vehicle/load location, or if the motor vehicle operator fails to make scheduled daily contacts. Motor vehicle/load location verification and motor vehicle operator daily contact information must be made available to BEI by telephone or facsimile transmittal with one hour of request. A written description of the tracking and notification system shall be submitted to BEI for approval.

The Subcontractor shall provide the capability to recall or reroute a shipment due to unforeseen events which may require the motor vehicle/load to return to the origination point or be rerouted to an alternate TSDF. This capability may be provided through the use of the satellite tracking/daily call-in system or the telephone call-in/call-back system. BEI shall be notified immediately if the Subcontractor is unable to recall or reroute a shipment.

The Subcontractor shall notify BEI immediately upon learning that a scheduled time of arrival, at either the TSDF or at a Navy site, has changed. BEI shall be notified immediately if the Subcontractor's motor vehicle is delayed due to equipment failure, accident, inclement weather, or any condition that prevents the motor vehicle/load from continuing on the approved route and/or transportation schedule. BEI shall be informed of the exact location and condition of the Subcontractor's motor vehicle and of BEI's load when a change of schedule or delay as described above occurs.

The Subcontractor shall contact the TSDF, or other destination, 24 hours in advance to schedule an arrival time. The Subcontractor shall be responsible for contacting the pickup and destination facilities before shipments begin, to identify appropriate procedures at the individual facilities (i.e., opening and closing times, pass requirements, etc.). Any cost incurred due to failure to comply with these procedures, or due to lack of appropriate planning, shall be the responsibility of the Subcontractor. The contact and telephone number for the pickup and destination facilities will be provided with the Work Release or as otherwise provided. BEI shall be notified within 24 hours of the scheduled delivery date if the shipment was not delivered to the TSDF on the scheduled delivery date.

If, during BEI's business day, the Subcontractor becomes aware of an inability to track, recall, or reroute BEI loads, or that the Subcontractor's motor vehicle is unable to maintain the approved transportation route and/or schedule, the Subcontractor shall notify BEI immediately, and if initially



unsuccessful, shall continue to attempt to notify BEI. If, after the close of BEI's business day, the Subcontractor becomes aware of a condition as described above, notification of such condition shall be made at the start of BEI's next business day. BEI will provide a contact telephone number for such notification prior to each shipment.

In addition to immediate notification by telephone, the Subcontractor shall submit to BEI within five days of loss of verified daily contact with the motor vehicle/load, a written report which shall include:

- Time, date, and location of last daily contact.
- Time, date, location, and condition of the motor vehicle/load when contact was reinstated.
- A description of the methods/agencies used to reinstate contact and to verify location of the motor vehicle/load.
- A description of the methods used to reinstate transportation services, if an interruption of services occurred.
- Any additional pertinent information concerning the incident.

#### 4.10.2 Transportation by Rail

The Subcontractor shall notify BEI of any abnormal occurrences identified in the following subsections or any similar, but not identified, occurrences.

##### Location Tracking and Notification

The Subcontractor shall have in operation a system which identified the location of each BEI rail freight car grouping in transit from the Navy site to the designated TSDF. At least once per work day, the Subcontractor shall notify BEI as to the location of each rail freight car grouping. This may be accomplished by facsimile.

The Subcontractor system may be automated using bar coding reader stations, satellite tracking, or manual telephone call-in/call-back systems. Daily location verification information must be made available to BEI by telephone, computer, or facsimile transmittal within one hour of request.

The Subcontractor shall contact the disposal site 24 hours in advance of the scheduled arrival time.

##### Movement of Defective Cars for Repair

The Subcontractor shall notify BEI as soon as practical whenever a loaded rail freight car has been determined to have a defective component. The Subcontractor shall relay to BEI's Subcontractor

Administrator the related information and restrictions imposed by the designated inspector in accordance with 49 CFR Part 215.9.

### **Reporting Hazardous Material Incidents and Abnormal Occurrences**

The term *abnormal occurrences* means any of, or similar to, the following conditions noted during transport of hazardous materials, substances, or wastes:

- failure of the watertight, sift-proof liner
- broken tamper-indicating devices or package seals
- deviation from the designated routing maps
- any transportation condition that is not normally incident to transportation

As soon as practical, the Subcontractor shall notify BEI of an incident which occurs during transportation in which Navy wastes are involved, whether a report is or is not required by 49 CFR Parts 171.15 and 171.16.

### **Leaking Rail Freight Cars and/or Intermodal Packages**

The Subcontractor shall notify BEI immediately of any noted leakage of Navy waste material from any rail freight car or intermodal package during transportation.

### **Emergency Response Plan**

The Subcontractor shall submit a written transportation Emergency Response Plan. The plan shall include instructions for compliance with 49 CFR Part 171.15, "Immediate Notice of Certain Hazardous Material Incidents." The plan shall include all aspects and considerations arising from transport incidents involving hazardous substances, materials, or wastes. The plan shall be submitted to BEI for review at least 10 working days in advance of any waste transportation as scheduled. The plan shall include the name of the Subcontractor emergency response coordinator.

## **4.11 PUBLISHED TARIFF RATES**

The Subcontractor shall submit to BEI proof that each subcontracted item listed in Part III, Pricing and Data, b. Schedule of Quantities and Prices, of the Subcontract has been submitted and published through the Interstate Commerce Commission (ICC) tariff system as defined in Title 49 CFR 1300 through 1319.

## **4.12 ADDITIONAL REQUIREMENTS FOR LOOSE CONVEYANCE LOADS**

Vehicles used for loose conveyance transport of soil shall meet the following requirements:

- (1) The truckbed shall be free of drain holes, cracks, or other conditions that may allow leakage of soil.

- (2) If the vehicle has a tailgate for dumping, the Subcontractor vehicle operator shall demonstrate to the BEI site superintendent or designee that the tailgate can maintain a seal. A vehicle that cannot maintain a seal will be repaired or replaced by the Subcontractor before being placed into service. If seals fail after the vehicle is placed into service, they are to be repaired immediately, and BEI shall be notified.
- (3) Vehicles are not to be equipped with side boards while transporting loose conveyances.
- (4) Material shall not be loaded higher than one foot below the top of the vehicle side walls.
- (5) Tarpaulin covers shall be installed and used on all vehicles. Before being installed, sharp objects and/or protrusions are to be eliminated to prevent cutting or puncture of the tarpaulin.
- (6) Tarpaulins are to be firmly secured over the soil with sufficient overlap so that the material will not be blown from the vehicle during transport. BEI will inspect the tarpaulin for adequate installation.

## 5.0 MOTOR VEHICLE LOADING AND UNLOADING OPERATIONS

All areas and buildings of the Navy sites (or TSDF) are off limits to Subcontractor motor vehicles (and motor vehicle operators) except those areas and buildings designated by BEI (or TSDF). Motor vehicle operators will be supervised by BEI (or TSDF) at all times while at BEI (or TSDF) sites and shall remain inside the tractor cab at all times, unless directed otherwise by BEI (or TSDF).

All Subcontractor motor vehicles will be monitored by BEI for external contamination prior to being allowed onto Navy sites. Subcontractor motor vehicles shall arrive at the site sufficiently clean to allow accurate monitoring. Motor vehicles shall be free of dried mud, dirt, grease, or other accumulations. If accurate monitoring is unsuccessful, due to excess mud, dirt, grease, or other accumulations, the motor vehicle shall be removed from the site and cleaned. Motor vehicle cleaning and time lost will be at the Subcontractor's expense. Only motor vehicles determined to be free of contamination will be allowed onto Navy sites.

Loading and unloading operations will be the responsibility of BEI (or TSDF) and will be conducted in a highly controlled manner that prevents contamination of motor vehicles. BEI (or TSDF) will verify that motor vehicles are free of contamination before their release from the loading/unloading area. Subcontractor motor vehicles will be checked for contamination as appropriate prior to leaving the loading/unloading area.

Motor vehicles that become contaminated during loading/unloading operations will be decontaminated by BEI (or TSDF). After decontamination, the motor vehicle will be checked again by BEI (or TSDF) to verify that it is free of contamination prior to its release for transport.

Load configurations shall be a joint effort of BEI and the motor vehicle operator(s). After loading, and prior to leaving the site (or TSDF), the motor vehicle operator(s) shall perform an inspection

to verify the load is arranged and secured properly (based on experience and training, and in accordance with Title 49 CFR 393, Subpart I, "Protection Against Shifting or Falling Cargo," and 392.9, "Safe Loading").

Upon acceptance of the load for transport, the Subcontractor shall be responsible for maintaining the integrity of the load, the load arrangement, and any security seals. The motor vehicle operator shall examine and periodically reexamine the load (load inspections during transit do not apply to sealed trailers, only to the inspection of security seals) and its load-securing devices as may be necessary to maintain the integrity of the load and the load arrangement in accordance with Title 49 CFR 392.9.

The Subcontractor shall be in compliance with the requirements of Section 6.0, "Accidents Involving Transport Vehicles," of the Specification upon discovery of a change in the condition of BEI's load, load arrangement, or security seals (e.g., changed due to equipment/packaging failure, motor vehicle accident, adverse weather conditions, vandalism, or theft) which involves a release of HM, HW, or CM.

## 6.0 ACCIDENTS INVOLVING TRANSPORT VEHICLES

In the event of an accident, the Subcontractor shall follow the procedures outlined in his Emergency Response Plan and shall be in compliance with the requirements of Title 49 CFR 390.15, "Assistance in Investigations and Special Studies, Subpart E, Accidents and License Revocation: Duties of Driver," and 172, Subpart G, "Emergency Response Information."

In the event of an accident involving a release of HM, HW, or CM, the Subcontractor shall notify BEI immediately upon learning of the accident, and if initially unsuccessful, will continue to attempt to contact BEI. The Subcontractor shall use a 24-hour telephone contact number for accident notification, when notification attempts are outside BEI's business day. BEI will provide the 24-hour telephone contact number for such notification prior to each shipment.

Notification of an accident shall include location, date and time of the accident, resultant damage or injury, person(s) involved, probable cause, condition of the load, if HM, HW, or CM was released and the amount, and any other pertinent information concerning the accident. Also to be included if applicable, are weather conditions, distance to water sources, government agencies on the scene and a telephone number where communications can be maintained.

The motor vehicle operator shall comply with all directions provided by BEI, unless counter to FHWA regulations, and/or the laws and ordinances of the jurisdiction in which the motor vehicle was in operation at the time of the accident. BEI will issue instructions regarding continued transportation of the load. The motor vehicle operator shall remain with the motor vehicle until assistance arrives or until otherwise directed.

The Subcontractor shall submit to BEI within five days of an accident or incident involving a release of HM, HW, or CM a written report which shall include the location, date and time of the accident

or incident, resultant damage or injury, person(s) involved, probable cause, the amount of HM, HW, or CM released, government agencies involved, and any other pertinent information concerning the accident or release. In addition, when an accident or incident occurs involving the release of HM, HW, or CM, the Subcontractor shall submit to BEI copies of any accident/incident reports required by State or other governmental entities.

## 7.0 SUBMITTALS

BEI engineering documentation requirements are summarized in the Subcontractor Submittal Requirements Summary of the issued Subcontract package. BEI will determine if documentation is complete as submitted by the Subcontractor, and reserve the right to reject and require resubmittal of any submittal that in BEI's opinion does not meet the Subcontract requirements.


Submittals that are specific to each individual motor vehicle operator (e.g., Brake Inspection Certificate, Brake Inspector's Certification, copy of CDL, Medical Examiner's Certificate) must be received and accepted by BEI within five working days of BEI's notification to the Subcontractor for motor vehicles. Nonshipment specific submittals (e.g., Motor Carrier Safety Rating, Carrier Surety Bond, or Policies of Insurance) required upon acceptance of the Subcontract award, must be received within five working days from time of Subcontract award notification and acceptance. Status of the submittals will be made to the Subcontractor by BEI within three working days following the receipt of required submittals. Rejected submittals must be corrected and received by BEI within three working days of notification of submittal rejection. All submittals must be accepted by BEI prior to the start of onsite work.

Affidavits submitted in lieu of specific Subcontract submittal certificates, licenses, or permits must be signed using the Subcontractor representative's full name and his/her company title. The affidavit must be dated, notarized, and have a reference to the submittal number found in BEI's Subcontractor Submittal Requirements Summary. The CFR number, if applicable, must be referenced with its relationship to the specific submittal requirement. The affidavit must be in statement form with an explanation of how the affidavit fulfills the submittal requirement. Acceptance of an affidavit in lieu of certificates, licenses, or permits is at the direction of BEI.

**APPENDIX F**

**TECHNICAL SPECIFICATION FOR  
UNCONTAMINATED EARTHWORK**

DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION  
  
STANDARD SPECIFICATION  
FOR  
UNCONTAMINATED EARTHWORK

1	1-31-95	Revised throughout and to CSI format	KK	STB	FAR	JRM
0	7/21/94	Issued for use	KK	RTJ	PH	RBB
NO.	DATE	REVISION	BY	CHECK	SUPV	PE
ORIGIN  		NO. 22567 STANDARD SPECIFICATION 001-SP000-006 SHEET 1 OF 17				
		Uncontaminated Earthwork	Rev 1			

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## **PART 1.0 GENERAL**

### **1.1 SCOPE**

Perform excavation of uncontaminated materials.

### **1.2 WORK INCLUDED**

- 1.2.1 Furnishing labor, materials, tools and equipment.
- 1.2.2 Installing and maintaining dust, sediment and erosion control.
- 1.2.3 Performing soil testing
- 1.2.4 Providing shoring as needed.
- 1.2.5 Securing area (temporary barriers) as needed.
- 1.2.6 Excavating and backfilling uncontaminated material.

### **1.3 RELATED WORK NOT INCLUDED**

- 1.3.1 Establishing limits of excavation and backfill.
- 1.3.2 Clearing and grubbing is included in Technical Specification 001-SP000-002.

### **1.4 REFERENCED CODES AND STANDARDS**

Unless otherwise specified or shown, the latest edition of the following Codes and Standards at the time of bid shall apply to the extent indicated herein.

#### **1.4.1 American Society for Testing and Materials (ASTM)**

- ASTM D 1556 Density of Soil In-Place by the Sand-Cone Method
- ASTM D 1557 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
- ASTM D 2167 Density and Unit Weight of Soils In-Place by the Rubber Balloon Method
- ASTM D 2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
- ASTM D 2487 Classification of Soils for Engineering Purposes
- ASTM D 2922 Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)

- ASTM D 3017 Water Content of Soil and Rock In-Place by Nuclear Methods (Shallow Depth)
- ASTM D 4253 Maximum Index Density of Soils Using a Vibratory Table
- ASTM D 4254 Minimum Index Density of Soils and Calculation of Relative Density
- ASTM D 4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

#### **1.4.2 Occupational Safety and Health (OSHA)**

- 29 CFR 1910 Occupational Safety and Health Regulations for General Industry
- 29 CFR 1926 Occupational Safety and Health Regulations for Construction

### **1.5 SUBMITTALS**

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F (Attachment A), "Subcontractor Submittal Requirements Summary" (SSRS), shall apply. Submittals identified shall meet the detailed requirements herein. Bechtel will determine if documentation is complete as submitted and reserves the right to require the resubmittal of any submittals that do not meet specified requirements.

#### **1.5.1 Testing Reports**

Submit two unbound copies of testing results, including calibration curves and calibration results within 24 hours of conclusion of physical tests.

#### **1.5.2 Testing Laboratory Certifications and Qualifications**

Submit qualifications and requested certifications of the commercial testing laboratory. Include resumes of key personnel, client references from previous work of similar scope and laboratory capabilities.

#### **1.5.3 List of Equipment**

Submit a list of equipment proposed for use. Include type, size, and rating of equipment proposed to be used. For compactive rollers, include the weight, drum, or wheel size and cleat size, if any.

#### **1.5.4 Onsite Borrow Pit Operations**

Submit proposed operations plans for any onsite borrow pit(s). Include proposed procedures and plans for control of water, erosion and dust, access road construction and maintenance, and borrow excavation. Bechtel will provide the information on onsite borrow pit location and available test reports on the borrow material.

#### **1.5.5 Offsite Borrow Pit Operations**

Submit proposed offsite borrow information to include: borrow pit location and address, owner's name and state permit/licensing number, and the ASTM test reports required to satisfy the requirements listed in the "2.0 PRODUCTS" section of this specification.

#### **1.5.6 Aggregate Source**

Submit proposed offsite aggregate source information to include aggregate source location and address, owner's name and state permit/licensing number, and ASTM test reports required to satisfy the requirements listed in the "2.0 PRODUCTS" section of this specification.

#### **1.5.7 Protection of Existing Foundations**

Submit proposed modifications to protect existing foundations in accordance with this specification.

#### **1.5.8 Shoring Design and Calculations**

Submit proposed shoring design and engineering calculations or alternate slope protection measures in accordance with Subpart P, OSHA 29 CFR 1926. Design shall be signed and stamped by a Professional Engineer licensed in the state where the work is performed.

#### **1.5.9 Soils Laboratory Test Results**

Submit soil classification test results and relative density or compaction curve test results, as appropriate.

#### **1.5.10 Drainage Design**

Submit proposed drainage design prior to drainage system construction not indicated on engineering drawings. Design shall be signed and stamped by a Professional Engineer licensed in the state where the work is performed.

#### **1.5.11 Excavation Daily Inspections**

Submit daily inspections of the excavation areas in accordance with OSHA 29 CFR 1910 and 1926 prior to commencing work each day.

#### **1.5.12 Shoring Inspector**

Submit resume of the shoring inspector to be provided for bid evaluation. Inspector shall be qualified in accordance with Subpart P, OSHA 29 CFR 1926.

### **1.5.13 Professional Engineer's License**

Submit copy of Professional Engineer's license for bid evaluation (for the state where work is performed) for Professional Engineer(s) used for the shoring and drainage designs.

## **1.6 QUALITY STANDARDS**

Perform the work and control the quality of items and services to meet the requirements of this specification, subcontract documents, and applicable codes and standards.

## **1.7 DEFINITIONS**

### **1.7.1 Unstable Material**

Materials too weak, as determined by Bechtel, to properly support the utility pipe, conduit or appurtenant structure.

### **1.7.2 Rock**

Material that (1) measures approximately 1/2 cubic yard or more and cannot be removed without systematic drilling and blasting, such as rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits or (2) is below-grade concrete or masonry structures, exceeding 1/2 cubic yard in volume and greater than 9 in. in thickness. Asphaltic or portland cement pavements is not considered rock.

## **PART 2.0 PRODUCTS**

## **2.1 BACKFILL**

### **2.1.1 General**

Cohesive or cohesionless well-graded materials free of contamination, trash, debris, roots or other organic matter, frozen material, stones, or other material larger than 3 in. in any dimension, with a plasticity index (PI)  $\leq 20$ .

### **2.1.2 Structural**

Structural fill shall meet the requirements of general fill (Section 2.1.1) but shall have a PI of  $\leq 15$ .

## **2.2 BEDDING MATERIALS**

Bedding material shall consist of well-graded sand, gravel, or slag composed of hard, tough, and durable particles and shall contain not more than 10 percent by weight of material passing a No. 200 sieve and no less than 95 percent by weight, passing the 1-in. sieve or the maximum size recommended by the pipe manufacturer, whichever is smaller.

Bedding materials shall be free from rocks 2 in. or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. Bedding material, for pipes coated or wrapped for corrosion protection, shall be free of stones larger than 1 in. in any dimension, or as recommended by the pipe manufacturer, whichever is smaller.

### 2.3 AGGREGATE BASE

Aggregate base shall be in accordance with state transportation requirements.

### 2.4 TEMPORARY SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of straw bales, hay bales, geotextile filter fabric made expressly for use as a silt screen, or other materials approved by Bechtel prior to their use. Straw and hay bales shall not be used for permanent sediment barriers unless approved by Bechtel.

2.4.1 Baled hay or straw shall be laid end to end such that no gap exists between bales. Reinforcing bars shall be #4 bar and a minimum of 2½ ft long.

2.4.2 Filter fabric shall be a material made expressly for the purpose of sediment control such as Exxon GTF 101S Silt Screen or approved equal.

### 2.5 EROSION CONTROL BLANKETS

Erosion control blankets shall be Curlex Blankets manufactured by American Excelsior Company or approved equal.

### 2.6 PLASTIC MARKING TAPE

Plastic marking tape shall be of a type specifically manufactured for marking and locating underground utilities. It shall contain acid- and alkali-resistant polyethylene film and integral wires, foil backing, or other means to enable detection by a metal detector when the tape is buried in soil up to 3 ft deep. The metallic core of the tape shall be encased in a protective jacket or provided with other metallic core type to protect it from corrosion. The plastic marking tape shall have the following properties:

<u>Properties</u>	<u>Value</u>
Thickness (min.)	0.004-in.
Width	6-in.
Strength (min.)	
lengthwise	1750 psi
crosswise	1500 psi

<u>Properties</u>	<u>Value</u>
Color	Utility line type
Red	Electric
Yellow	Gas, Oil, Dangerous materials
Orange	Telephone, Telegraph, Television, Police, Fire, Communication
Blue	Water
Green	Sewer

## **PART 3.0 EXECUTION**

### **3.1 PRE-EARTHWORK EVALUATION**

Prior to performing any earthwork, examine the work area to identify pre-existing conditions (e.g. overhead power lines, access, etc.) that could impact the performance and completion of work. Bechtel will provide available information on the location of underground utilities. Verify these locations, provide structural support to utility lines, and coordinate inspection with and provide support to utility companies. Unless directed otherwise, the services of all underground utilities encountered during any earthwork shall be restored to their original condition. Applicable permits shall be obtained prior to commencing work unless directed otherwise.

### **3.2 EROSION AND SEDIMENT CONTROL**

Temporary sediment barriers shall be installed in accordance with the subcontract documents and maintained during construction until permanent sediment barriers are in place.

Erosion and sediment shall be controlled by the following techniques subject to Bechtel review on a case-by-case basis:

- covering with synthetic liner material
- covering with uncontaminated soil material
- sediment barriers

### **3.3 DUST CONTROL**

Dust shall be controlled by the following techniques subject to Bechtel review on a case-by-case basis:

- wetting with water
- wetting with a synthetic dust suppressant
- establishing temporary vegetative cover
- compaction
- sealing by rolling with a smooth drum

### **3.4 DRAINAGE, DEWATERING, AND STREAM DIVERSION**

#### **3.4.1 Drainage**

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grading shall be developed and maintained during construction.

Excavated slopes and backfill surfaces shall have a minimum 3% slope to promote runoff and shall be protected from erosion and sloughing. Excavation slopes shall conform to Subpart P, "Excavation, Trenching, and Shoring," of OSHA 29 CFR 1926.

#### **3.4.2 Dewatering**

Unless noted otherwise, all excavations shall be kept in a dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave in the excavation; and to eliminate any interference with excavation progress.

#### **3.4.3 Stream Diversion**

Stream diversion(s) shall be developed as shown on the engineering drawings or Scope of Work.

### **3.5 BLASTING**

Blasting is not permitted.

### **3.6 EXCAVATION**

#### **3.6.1 General**

Excavation shall conform to the lines, grades, and depths identified on the engineering drawings or Scope of Work, and field-verified by Bechtel in accordance with OSHA regulations. Excavated areas shall be maintained in a clean condition, free from leaves, brush, trash and other debris. They shall be inspected and documented daily, prior to commencing work, in accordance with OSHA 29 CFR 1910 and 1926.

#### **3.6.2 Shoring**

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled to prevent cave-ins. Alternate methods (e.g. benching, sloping, trench boxes, etc.) may be used where applicable. They shall be developed in accordance with Subpart P, OSHA 29 CFR 1926.



### **3.6.3 Foundation Excavation**

Excavations shall extend a sufficient distance from walls and footings to allow for placement and removal of forms. Excavation to final grade shall be performed within 48 hours of subsequent concrete placement. Only excavation methods that will leave the foundation soils in a solid condition shall be used. Excavation shall be inspected and approved by Bechtel prior to placement of rebar.

### **3.6.4 Utility Excavation**

#### **Trench Excavation**

Trench walls below the top of utility lines (pipe or conduit) shall be sloped or made vertical as recommended by the manufacturer. Installation shall be in accordance with OSHA 2207. Trench walls more than five ft deep shall be shored, cut back to a stable slope at least equal to the angle of repose, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave-in. Special considerations shall be given to slopes that may be adversely affected by construction erosion or sloughing. Remove and handle any additional material caused by erosion or sloughing.

#### **Excavation Widths**

The trench width below the top of pipe shall not exceed 24 in. plus pipe or conduit outside diameter (O.D.) for pipes or conduits of less than 24 in. inside diameter (I.D.), and 36 in. plus pipe O.D. for pipes larger than 24 in. I.D. Where recommended trench widths are exceeded, redesign a stronger pipe or conduit, or utilize special installation procedures.

#### **Rock**

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe or conduit of at least 9 in. Where bell-and-spigot pipe or slip-jointed conduit is used, the cushion shall be maintained under the joint as well as under the straight portion of the pipe or conduit. Rock faces shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown on the engineering drawings or as directed by Bechtel. Loose disintegrated rock and thin strata shall be removed.

#### **Appurtenances**

Excavation for manholes, catch basins, inlets or similar structures shall be sufficient to leave at least 12 in. clear between outer structure surfaces and the face of the excavation or support members. Removal of unstable/unyielding material (e.g., loose disintegrated rock and thin strata, etc.) shall be removed as specified herein. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation.

## **Trench Bottoms**

Trench bottoms shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of pipe.

## **Replacement of Unstable/Unyielding Material**

Where unstable and/or unyielding material is encountered in the trench bottom, such material shall be removed as required herein or as directed by Bechtel and replaced with bedding material.

## **3.7 OVEREXCAVATION**

Overexcavation shall be backfilled to design grade with general backfill and compacted to a density equal to or greater than that required for the subsequent fill material.

## **3.8 DITCHES, GUTTERS, AND CHANNELS**

Ditches, gutters, and channel changes shall be cut accurately to the cross sections and grades indicated on the engineering drawings or as directed by Bechtel. All roots, stumps, rock, and foreign matter in the sides and/or bottom of ditches, gutters, and channel changes shall be trimmed and dressed or removed to conform to the slope, grade and shape of the section indicated.

## **3.9 STOCKPILING**

Excavated material satisfying the requirements for backfill in this specification shall be either transported and placed in designated fills or stockpiled at onsite locations as determined by Bechtel. All materials to be stockpiled shall be placed in areas that have been cleared and grubbed.

Stockpiles shall be kept in a neat and well-drained condition. Excavated backfill material and unsatisfactory materials shall be stockpiled separately. Stockpiles of satisfactory materials shall be protected from contamination. If the material in the stockpile becomes unsatisfactory for use as backfill such material shall be removed and replaced with satisfactory material from sources approved by Bechtel.

## **3.10 SUBGRADE PREPARATION**

Subgrades in structural areas shall be proof-rolled prior to placement of fill. Unsatisfactory material identified by proof-rolling shall be removed and replaced with general backfill and compacted in accordance with this specification.

Subgrades and compacted lifts for backfills shall be either scarified 2 in. prior to placement of the subsequent lift or compacted by sheepfoot roller or similar equipment designed to compact the lift from the bottom to the top.

### **3.11 BORROW AND AGGREGATE SOURCES**

Unless directed otherwise, borrow material shall be obtained from onsite areas designated by Bechtel. Borrow areas shall be cleared, grubbed, disposed of debris, and surface water flow and erosion controlled. This work shall be considered operation related to onsite borrow excavation and shall be performed in accordance with this specification. If directed by Bechtel, the borrow and/or aggregate sources shall be identified and certification provided to Bechtel that the borrow/aggregate materials meets the requirements of this specification and transport material to the fill area. No offsite borrow and/or aggregate shall be brought onsite without prior written approval by Bechtel.

### **3.12 BACKFILLING**

#### **3.12.1 General**

General backfill shall be used for bringing fill and excavations to the lines and grades identified by Bechtel, and for replacing unsatisfactory subgrade materials. Compaction shall be accomplished by rollers and other equipment accepted by Bechtel suited to the type of material being compacted. Backfill shall be placed in horizontal layers not exceeding 8 in. in loose thickness when using conventional compaction equipment or 6 in. when using hand-operated compaction equipment. Backfill shall not be placed on unsatisfactory materials.

#### **3.12.2 Placement and Compaction Requirements**

Compacted subgrades damaged during performance or work shall be repaired to the required density prior to further construction at no expense to Bechtel. Each lift shall be moisture conditioned or aerated as necessary and compacted to not less than the percentage of maximum density specified below:

- The relative compaction (RC) and relative density (RD) of pipe or conduit bedding material shall be 90 percent and 70 percent respectively.
- In unpaved areas, general backfill shall be used and compacted to 85 percent RC and 50 percent RD.
- In areas to receive structures, general backfill shall be placed to 2 ft below footing depth and compacted to 90 percent RC, 70 percent RD. Structural fill, placed at 95 percent RC, 80 percent RD shall be used in the top 2 ft.
- In areas to receive paving, general backfill shall be placed to 6 in. below subgrade elevation, and compacted to 90 percent RC, 70 percent RD. Structural fill, placed at 95 percent RC, 80 percent RD shall be used in the top 6 in.

Backfilling adjacent to structures shall be placed and compacted uniformly to prevent wedging action or eccentric loading upon or against the structure. Backfill shall not be placed against concrete or masonry foundation wall prior to 7 days after completion of the walls.

### **Additional Requirements for Trench Backfilling**

Damaged pipes, conduits, culverts, or storm drains damaged from the performance of work shall be repaired or replaced at no expense to Bechtel.

Bedding material shall be in accordance with Part 2, "Products." Care shall be taken to ensure the bedding under the haunches of the pipe or conduit are compacted. The bedding shall be placed and compacted with approved tampers to a height of 1 ft above the utility line or as specified on the engineering drawings or as directed by Bechtel. The bedding surface for the line shall provide a firm foundation of uniform density throughout the entire length of the line. The joints and/or couplings shall be left uncovered during pressure tests.

Final backfill shall not be placed above the top of the pipe or conduit until all tests are satisfactorily performed. The remainder of the trench shall be filled with general or structural backfill and compacted to grade in accordance with this specification.

Manholes, catch basins, inlets, or similar structures shall be placed in such a manner that the structure will not be damaged by the shock of falling earth while backfilling. Backfill material shall be deposited and compacted as specified for final backfill and shall be brought up evenly, as practical, on all sides of the structure to prevent eccentric loading and stress.

Plastic marking tape as specified in Part 2, "Products," shall be installed 18 in. directly above the utility line.

### **3.13 AGGREGATE BASES**

Aggregate bases shall be constructed under pavements and placed directly on the subgrade. The aggregate base shall be placed in 4-in. lifts and compacted with a minimum of two passes of a hand-operated plate-type vibratory compactor or equivalent compactive effort. The material shall be compacted to 95 percent RC.

### **3.14 FINISH GRADING**

Graded areas shall be constructed true-to-grade, shaped to drain, and maintained free of trash and debris until final inspection is completed and the work is accepted. The embankment and excavation surfaces shall be finished to a smooth and compact surface in accordance with the lines, cross-sections or elevations and grades shown on the engineering drawings. Unless indicated otherwise, tolerances for graded areas shall be  $\pm 0.1$  ft.

### **3.15 PROTECTION OF WORK**

Settlement or erosion that occurs in backfilled, filled, graded, or topsoiled areas prior to acceptance of the work shall be repaired to the required conditions at no expense to Bechtel.

### **3.16 SECURITY**

When necessary and practical, as determined by Bechtel, work areas shall be secured using barriers (e.g., rope, snow fence) to prevent inadvertent entry to work areas.

### **3.17 QUALITY CONTROL AND VERIFICATION**

- 3.17.1** Testing shall be performed by a commercial testing laboratory approved by Bechtel. Verification that the placement of backfill meets the requirements of this specification shall be submitted via testing reports. Testing shall be considered part of earthwork.
- 3.17.2** Test results shall be submitted for review prior to placement of the next lift above that area.
- 3.17.3** Table 3-1 shows the tests to be performed, test specifications, and test frequencies to verify that the backfill meets specification requirements. Additional tests shall be performed if the material or compaction requirements of this specification are not met.

Table 3-1  
Backfill Testing Specifications

<u>Test Name</u>	<u>Test Specification</u>	<u>Test Application</u>	<u>Test Frequency</u>
Moisture-Density Relation	ASTM D 1557 or ASTM D4253 and ASTM D 4254	Each type of material or source of material to determine optimum moisture and laboratory maximum density values	a) one representative test per 2,000 cy of fill and backfill or when any change in material occurs that may affect the optimum moisture content or laboratory maximum density.
In-Place Moisture Content	ASTM D 3017 ASTM D 2216	ASTM D 3017 is for determining moisture content of soil backfill. ASTM D 2216 is for checking accuracy of ASTM D 3017	a) one test per 20,000 sf or one test per lift, whichever is greater, for general backfill areas compacted by other than hand or hand-operated machines.
and			b) one test per 10,000 sf or minimum of one test per lift, whichever is greater, for general backfill areas compacted by hand or hand-operated machines.
In-place Density	ASTM D 2922 ASTM D 1556 or ASTM D 2167	ASTM D 2922 is for determining field in-place density (see Note 1 under "Test Frequency"). ASTM D 1556 or ASTM D 2167 are for checking accuracy or ASTM D 2922.	c) one test per 2,000 sf or minimum of two tests per lift, whichever is greater, for structural backfill areas compacted by other than hand-operated machines. d) one test per 1,000 sf or minimum of two tests per lift, whichever is greater, for structural backfill areas compacted hand-operated machines.
			e) one test per each area less than 1,000 sf or one test for each 100 lf of length, whichever is greater, for trenches, pits, building perimeters, or other structures or areas less than 10 ft in width and compacted by hand-operated machines.

Table 3-1  
Backfill Testing Specifications (continued)

Test Name	Test Specification	Test Application	Test Frequency
Accuracy Tests			Accuracy Test: One ASTM D 2216 test for every ten ASTM D 3017 tests performed.
			Accuracy Test: One ASTM D 1556 of ASTM D 2167 test for every 20 ASTM D 2922 tests performed.
			<p>Note 1: The calibration curves for ASTM D 2922 shall be checked and adjusted per ASTM D 2922, "Adjusting Calibration Curve".</p> <p>Both the calibration curves furnished with the moisture gauges and density calibration curves shall also be checked per ASTM D 3017.</p> <p>Calibration checks of the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at the beginning and end of each day that the equipment is used.</p>

Table 3-1  
Backfill Testing Specifications (continued)

Test Name	Test Specification	Test Application	Test Frequency
Accuracy Tests			<p>Accuracy Test: One ASTM D 2216 test for every ten ASTM D 3017 tests performed.</p> <p>Accuracy Test: One ASTM D 1556 of ASTM D 2167 test for every 20 ASTM D 2922 tests performed.</p> <p>Note 1: The calibration curves for ASTM D 2922 shall be checked and adjusted per ASTM D 2922, "Adjusting Calibration Curve". Both the calibration curves furnished with the moisture gauges and density calibration curves shall also be checked per ASTM D 3017. Calibration checks of the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at the beginning and end of each day that the equipment is used.</p>



**APPENDIX G**  
**EXAMPLE FIELD SCREENING METHOD**



**ENSYS**  
ENVIRONMENTAL  
PRODUCTS, INC.



**Portable Analytical  
Test Kits  
for  
EPA Methods**



# Benefits of Using EnSys Test Kits

## Field Compatibility

The EnSys test kits are packaged and shipped to you with all the materials needed to accurately analyze samples on-site. Our completely portable, battery-operated equipment is compatible with any testing site.

## Specificity

The tests are sensitive to individual compounds or classes of compounds; they are not notably affected by the composition of the sample (soil or water) or by the matrix.

## Real Time Results

Instead of waiting days or weeks to get results back from the laboratory, the EnSys test kits give you accurate results on-site in thirty minutes.

## EPA Approval

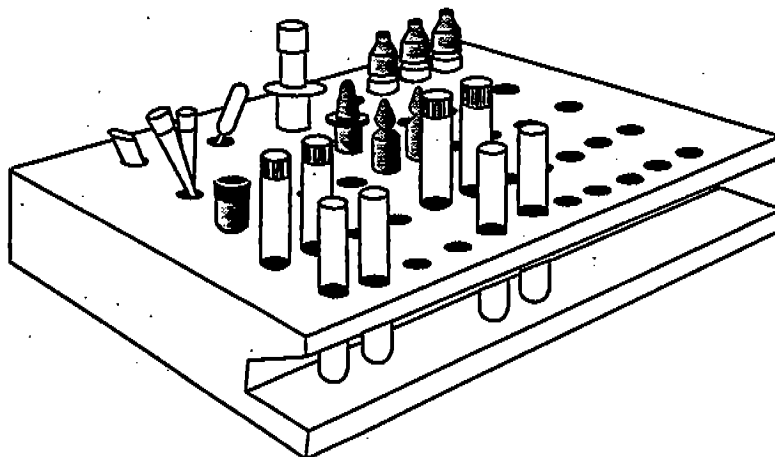
EPA validation studies and customer feedback indicate that our field analytical test systems accurately identify over 95% of samples that are contaminated at or above the chosen action level. Based on this data, the majority of the EnSys test kits have been assigned draft methods by the EPA Office of Solid Waste.

## Cost Effectiveness

Not only will EnSys test kits help you improve overall data quality, but they will also help you reduce your environmental cleanup costs. The EnSys test kits allow you to use your project resources more efficiently and avoid the material handling, overhead, and equipment costs, that make laboratory results more expensive.

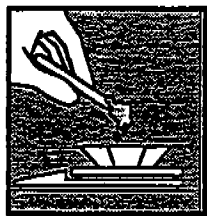
## Customization

We customize our kits and detection levels to meet your site-specific needs.



# ● How To Run An EnSys Test Kit

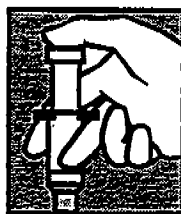
## Step 1: Sample Extraction - 5 Minutes



Weigh

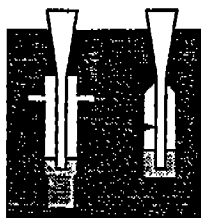


Extract

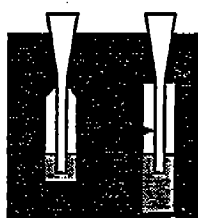


Filter

## Step 2: Sample Preparation - 5 minutes



A.

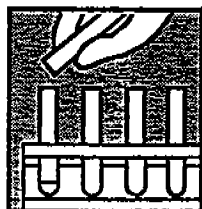


B.

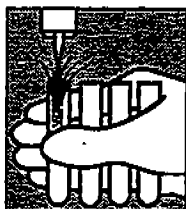
A: Withdraw filtered sample using mechanical pipette and dispense into dilution ampule.

B: Transfer from each dilution ampule into glass buffer tubes.

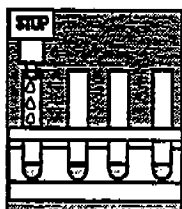
## Step 3: Immunoassay - 10 minutes



A.



B.



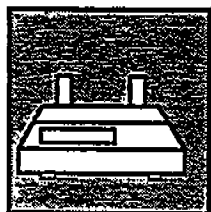
C.

A. Incubate tubes with sample (or standard) and enzyme conjugate.

B. Wash tubes.

C. Add color development solution.

## Step 4: Interpret Results - 3 minutes



Results are determined by comparing the color developed in a standard to the color in a sample using a photometer supplied by EnSys.

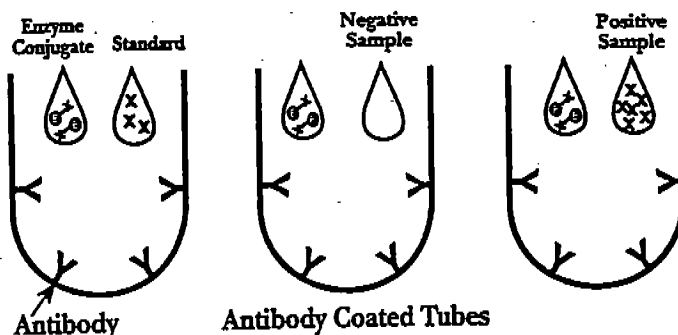




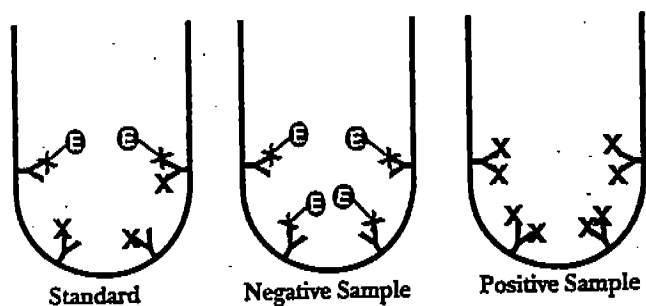
# What is Immunoassay Technology?

The immunoassay technique relies on an antibody that is developed to have a high degree of sensitivity to the target compound. This antibody's high specificity is coupled with a sensitive colorimetric reaction that provides visualization of the result. In the environmental industry, immunoassay methods provide timely, cost effective, and accurate information on contamination levels of key pollutants.

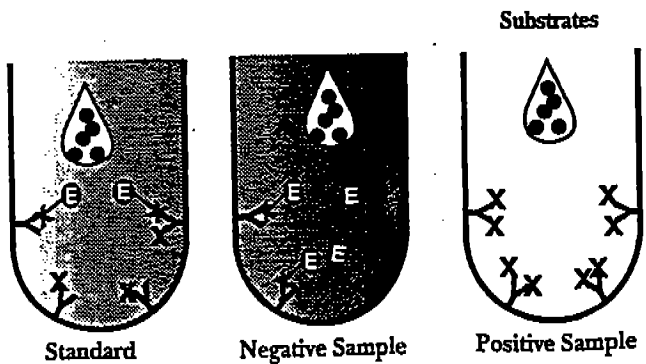
1. The immunoassay analysis starts when enzyme conjugate is added to antibody coated tubes.



2. The target analyte, which may be present in the samples, "competes" with the enzyme conjugate for a limited number of antibody binding sites. After a washing step, the enzyme conjugate or target analyte bound to the antibody in the tube remains.



3. Substrate solution is added to produce a color. The intensity of the color formed is inversely proportional to the concentration of the target analyte in the sample. The Yes/No determination is made by comparing the color developed by an unknown sample to the color formed with the standard.



# PETRO RISC® Soil and Water Tests



## EPA Method 4030

The PETRO RISC® Soil and Water Tests enable environmental professionals to obtain analytical results in the field at the time of sampling. The application of field methods reduces equipment, personnel and analytical costs and improves overall project quality.

*The PETRO RISC® Soil and Water Tests are specific to compounds such as gasoline, diesel fuel and jet fuel with no sensitivity to potential interferents such as chlorinated solvents and MTBE.*

## Applications

### Petrochemical Industry

- Delineation of groundwater contamination
- Siting of groundwater monitoring wells
- Monitoring the progress of on -site groundwater extraction and treatment remediation
- Routine groundwater monitoring
- Stormwater run-off testing
- Delineation of soil contamination at plant sites and off-site waste impounds
- Monitoring of land/farm treatment units

### UST Removal and Remediation

- Delineation of groundwater contamination
- Siting of groundwater monitoring wells
- Routine groundwater monitoring
- Monitoring the progress of soil remediation
- Guiding collection of samples for closure permitting
- Mapping of sites

# PCB RISC<sup>®</sup> Soil and Wipe Tests



## EPA Method 4020

The PCB RISC<sup>®</sup> Soil and Wipe Tests enable environmental professionals to obtain analytical results in the field at the time of sampling. The application of field methods reduces equipment, personnel and analytical costs and improves overall project quality.

*The PCB RISC<sup>®</sup> Soil and Wipe Tests are specific to polychlorinated biphenyls with little sensitivity to potential interferents such as chlorinated benzenes and phenols.*

## Applications

### Utility and General Industry

- Emergency delineation of transformer contamination
- Delineation of equipment and building contamination
- Delineation of soil contamination at substations and plant sites
- Monitoring the progress of on-site and substation remediation

### Natural Gas Pipeline Industry

- Delineation of soil contamination at substations and plant sites
- Monitoring the progress of equipment decontamination
- Delineation of contamination at compressor station sites
- Delineation of soil contamination at off-site locations



# PCB RISC<sup>®</sup> Soil Test

## Specific Product Characteristics

### Minimum detection levels

#### Aroclor

#### Minimum Detection Level (ppm)

1260  
1254  
1248  
1242

0.4  
0.4  
1  
2



EPA Approval	The PCB RISC <sup>®</sup> Soil Test has been approved for inclusion in the third update of Test Methods for Solid Waste, SW-846, under EPA Draft Method 4020.
# of Analyses per kit	Four
Throughput Time	Four samples may be completed in less than 45 minutes.
Detection level	The levels can be adjusted to allow the user to test a contaminant concentration to suit the actual site action levels. Two detection levels allow the user to obtain a semi-quantitative result.
Storage	Room temperature



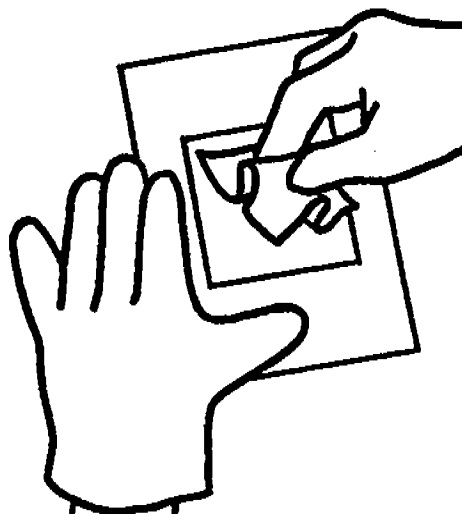
# PCB RISC<sup>®</sup> Wipe Test

## Specific Product Characteristics



### Minimum detection levels

<u>Aroclor</u>	<u>Minimum Detection Level</u>	<u>(ug/100 cm<sup>2</sup>)</u>
1260	4	
1254	4	
1248	10	
1242	20	



# of Analyses per kit	Four
Throughput Time	Four samples may be completed in less than 45 minutes.
Detection level	The levels can be adjusted to allow the user to test a contaminant concentration to suit the actual site action levels. Two detection levels allow the user to obtain a semi-quantitative result.
Storage	Room temperature

## METHOD 4020

### SCREENING FOR POLYCHLORINATED BIPHENYLS BY IMMUNOASSAY

#### 1.0 SCOPE AND APPLICATION

1.1 Method 4020 is a procedure for screening soils and non-aqueous waste liquids to determine when total polychlorinated biphenyls (PCBs) are present at concentrations above 5, 10 or 50 mg/kg. Method 4020 provides an estimate for the concentration of PCBs by comparison with a standard.

1.2 Using the test kit from which this method was developed, 95% of soil samples containing 0.625 ppm or less of PCBs will produce a negative result in the 5 ppm test configuration. Using another commercially available test kit, 97% of soil samples containing 0.25 ppm or less of PCBs will produce a negative result in the assay and greater than 99% of the samples containing 1.0 ppm or more will produce a positive result. Tables 2-5, 7, 10, and 11 present false positive and false negative data generated from commercially available test kits. Using a test kit commercially available for screening non-aqueous waste liquids, >95% of samples containing 0.2-0.5 ppm or less of PCB will produce a negative result.

1.3 In cases where the exact concentrations of PCBs are required, quantitative techniques (i.e., Method 8082) should be used.

1.4 This method is restricted to use by or under the supervision of trained analysts. Each analyst must demonstrate the ability to generate acceptable results with this method.

#### 2.0 SUMMARY OF METHOD

2.1 Test kits are commercially available for this method. The manufacturer's directions should be followed. In general, the method is performed using a sample extract. Sample and an enzyme conjugate reagent are added to immobilized antibody. The enzyme conjugate "competes" with PCB present in the sample for binding to immobilized anti-PCB antibody. The test is interpreted by comparing the response produced by testing a sample to the response produced by testing standard(s) simultaneously.

#### 3.0 INTERFERENCES

3.1 Chemically similar compounds and compounds which might be expected to be found in conjunction with PCB contamination were tested to determine the concentration required to produce a positive test result. These data are shown in Tables 1A, 1B, 1C, and 1D.

#### 4.0 APPARATUS AND MATERIALS

4.1 Immunoassay test kit: PCB RISC™ (EnSys, Inc.), EnviroGard™ PCB in Soil (Millipore, Inc.), D TECH™ PCB test (Strategic Diagnostics Inc.), PCB

standard soils and three soil samples whose PCB concentration had been established by Method 8082. Replicates were performed on seven of the standard soils and on one of the soil samples for a total of 25 separate analyses. Each of two different analysts ran the 25 analyses. Results indicated that "<" assignments are accurate with almost 99% certainty at the 50 ppm level while ">" assignments can be up to about 96% inaccurate as the sample concentration approaches that of the testing level. Corresponding certainties at the 5 ppm level are 92% and 82% respectively. Tables 2 and 3 summarize these results.

9.2 Table 4 presents method precision data generated using the PCB RISC<sup>TM</sup> test kit, comparing immunoassay test results with results obtained using Method 8082.

9.3 Method precision was determined with the EnviroGard PCB in Soil test kit by assaying 4 different soils (previously determined to contain 5.04, 9.78, 11.8, and 25.1 mg/kg by Method 8082), at three different sites, using three different lots of assay kits, three times a day for 9 days. A total of 81 analyses were performed for each soil. Error attributable to site, lot, date, and operator were determined. Separately, the relative reactivity of Aroclors 1242, 1248, 1254, and 1260 were determined. Based on Aroclor heterogeneity, and method imprecision, concentrations of Aroclor 1248 were selected that would result in greater than 99% confidence for negative interpretation. A study was conducted (Superfund SITE demonstration) on 114 field samples whose PCB concentration were also determined by Method 8082. 32 of the field samples were collected in duplicate (as coded field duplicates) and assayed by standard and immunoassay methods. The results for all 146 samples are summarized in Tables 5 and 6.

9.4 Grab samples were obtained from sites in Pennsylvania, Iowa and Illinois using a stainless steel trowel. Each sample was homogenized by placing approximately six cubic inches in a stainless steel bucket and mixing with the trowel for approximately two minutes. The soils was aliquotted into 2 six ounce glass bottles. The samples were tested on site using the D TECH PCB test kit, and sent to an analytical laboratory for analysis by Method 8082. These data are compared in Table 7.

9.5 Tables 8 and 9 present data on the inter- and intra-assay precision of the PCB RISC<sup>TM</sup> Liquid Waste Test System. The data were generated using 11 samples, each spiked at 0, 0.2 and 5 ppm, and assayed 4 times.

9.6 Tables 10 and 11 provide data from application of the PCB RISC<sup>TM</sup> Liquid Waste Test System to a series of liquid waste samples whose PCB concentration had been established by Method 8082.

## 10.0 REFERENCES

1. J.P. Mapes, T.N. Stewart, K.D. McKenzie, L.R. McClelland, R.L. Mudd, W.B. Manning, W.B. Studabaker, and S.B. Friedman, "PCB-RISC<sup>TM</sup> - An On-Site Immunoassay for Detecting PCB in Soil", Bull. Environ. Contam. Toxicol. (1993) 50:219-225.
2. PCB RISC<sup>TM</sup> Users Guide, Ensys Inc.

TABLE 1A CROSS REACTIVITY OF DIFFERENT COMPOUNDS*	
Compound	Soil Equivalent Concentration (ppm) Required to Yield a Positive Result
1-Chloronaphthalene	10,000
1,2,4-Trichlorobenzene	10,000
2,4-Dichlorophenyl-benzenesulfonate	1,000
2,4-Dichloro-1-naphthol	>10,000
BifenoX	500
Diesel fuel	>10,000
Pentachlorobenzene	>10,000
2,5-Dichloroaniline	>10,000
Hexachlorobenzene	>10,000
Gasoline	>10,000
Dichlorofenthion	10,000
Tetradifon	125

(a) PCB RISC<sup>TM</sup> test kit, Ensysis, Inc. publication

TABLE 1C CROSS REACTIVITY OF DIFFERENT COMPOUNDS <sup>a</sup>			
Compound	MDL <sup>b</sup> (ppm)	IC 50 <sup>c</sup> (ppm)	% CROSS REACTIVITY <sup>d</sup>
Aroclor 1016	5.7	83	12
Aroclor 1221	25.5	300	3
Aroclor 1232	9.0	105	10
Aroclor 1242	1.5	31	32
Aroclor 1248	0.8	24	42
Aroclor 1254	0.5	10	100
Aroclor 1260	0.75	10	100
Aroclor 1262	0.5	10	100
Aroclor 1268	3.8	40	25

METHOD: The compounds listed were assayed at various concentrations and compared against an inhibition curve generated using Aroclor 1254. The concentration of the compound required to elicit a positive response at the MDL as well as the concentration required to yield 50% inhibition compared to the standard curve were determined.

<sup>a</sup> D TECH<sup>TM</sup> PCB test kit

<sup>b</sup> The IC<sub>50</sub> is defined as the concentration of compound required to produce a test response equivalent to 50% of the maximum response.

<sup>c</sup> The Minimum Detection Limit (MDL) is defined as the lowest concentration of compound that yields a positive test result.

<sup>d</sup> % Crossreactivity is determined by dividing the equivalent Aroclor 1254 concentration by the actual compound concentration at IC<sub>50</sub>

TABLE 2.

ESTIMATED ERROR RATES FOR 5 PPM DILUTION <sup>a</sup>												
True Value (ppm)	0	1	2	3	4	5	6	7	8	9	10	20
Estimated Rate of False Positives (%)	1.3	13.2	39.2	65.2	82.3	.	.	.	.	.	.	.
Estimated Rate of False Negatives (%)	.	.	.	.	.	8.5	4.1	2.0	1.0	0.5	0.3	<0.1

TABLE 3.

ESTIMATED ERROR RATES FOR 50 PPM DILUTION <sup>a</sup>												
True Value (ppm)	0	5	10	15	20	30	40	50	60	70	80	100
Estimated Rate of False Positives (%)	1.0	7.9	24.5	46.0	65.0	87.3	95.6	.	.	.	.	.
Estimated Rate of False Negatives (%)	.	.	.	.	.	.	.	1.7	0.7	0.3	0.2	<0.1

(a) PCB RISC™ test kit

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**Table 4**  
**Comparison of PCB RISC Test Kit with GC**

Sample ID	Screening Test Results	GC Results	AGREEMENT <sup>a</sup> Y, FP, FN
247	5-50	18 ppm	Y
148	>50	18-34 ppm	FP
205	5-50	20 ppm	Y
162	5-50	20.4 ppm	Y
175	5-50	21.2 ppm	Y
176	5-50	21.6 ppm	Y
197	5-50	32 ppm	Y
243	5-50	32 ppm	Y
252	5-50	32 ppm	Y
178	5-50	43.7 ppm	Y
201	5-50	43 ppm	Y
254	5-50, >50	56 ppm	Y
238	>50	46-60 ppm	Y
248	5-50	44-60 ppm	Y
250	>50	68 ppm	Y
242	5-50	30-69 ppm	Y
256	>50	73 ppm	Y
249	>50	96 ppm	Y
245	>50	102 ppm	Y
241	5-50	154 ppm	FN
246	>50	154 ppm	Y
261	>50	204 ppm	Y
240	>50	251 ppm	Y
267	>50	339 ppm	Y
239	>50	460 ppm	Y
104	>50	200-3772 ppm	Y
108	>50	531-1450 ppm	Y

<sup>a</sup> Y=Yes, FN=False Negative, FP=False Positive

Table 5 (continued)

SAMPLE NUMBER	SCREENING RESULT <sup>a,d</sup>	GC RESULT <sup>c</sup> [8082]	AGREEMENT <sup>a</sup> Y, FN, FP
024D	<10	0.05	Y
025	>10	11.7	Y
026	<10	1.96	Y
027	<10	0.06	Y
028	<10	0.22	Y
028D	<10	0.22	Y
029	<10	0.23	Y
030	<10	1.15	Y
031	<10	0.26	Y
032	>10	47.6	Y
033	>10	6.00	FP <sup>a</sup>
034	>10	34.0	Y
035	<10	ND <sup>f</sup>	Y
035D	<10	ND <sup>f</sup>	Y
036	>10	816	Y
037	<10	0.06	Y
037D	<10	0.04	Y
038	>10	1030	Y
039	<10	0.68	Y
040	>10	4.25	FP
041	<10	ND <sup>f</sup>	Y
042	>10	0.52	FP
042D	>10	0.47	FP
043	>10	1.69	FP
043D	>10	1.74	FP
044	<10	0.59	Y



Table 5 (continued)

SAMPLE NUMBER	SCREENING RESULT <sup>c,d</sup>	GC RESULT <sup>a</sup> [8082]	AGREEMENT <sup>a</sup> Y, FN, FP
066	<10	1.98	Y
067	<10	0.08	Y
068	<10	0.50	Y
069	<10	ND <sup>f</sup>	Y
069D	<10	ND <sup>f</sup>	Y
070	<10	ND <sup>f</sup>	Y
071	<10	0.05	Y
071D	<10	ND <sup>f</sup>	Y
072	<10	0.04	Y
073	>10	15.8	Y
074	>10	13.3	Y
075	>10	23.0	Y
076	>10	46.7	Y
077	<10	ND <sup>f</sup>	Y
078	>10	2.27	FP
079	>10	42.8	Y
080	<10	3.77	Y
081	<10	0.69	Y
081D	<10	0.45	Y
082	<10	ND <sup>f</sup>	Y
082D	<10	0.24	Y
083	<10	0.48	Y
083D	<10	0.41	Y
084	>10	1.16	FP
084D	>10	1.08	FP
085	>10	428	Y

Table 5 (continued)

SAMPLE NUMBER	SCREENING RESULT <sup>c,d</sup>	GC RESULT <sup>e</sup> [8082]	AGREEMENT <sup>e</sup> Y, FN, FP
101	>10	1.21	FP
102	>10	293	Y
102D	>10	177	Y
103	>10	40.3	Y
104	>10	7.66	FP <sup>e</sup>
105	<10	0.21	Y
106	<10	2.50	Y
107	>10	14.1	Y
108	>10	3.84	FP
109	<10	ND <sup>f</sup>	Y
109D	<10	ND <sup>f</sup>	Y
110	<10	ND <sup>f</sup>	Y
111	<10	ND <sup>f</sup>	Y
112	>10	315	Y
113	>10	14.9	Y
114	>10	66.3	Y

<sup>c</sup> mg/kg (ppm)

<sup>d</sup> Screening Calibrator is 5 mg/kg Aroclor 1248

<sup>e</sup> Y=Yes, FN=False Negative, FP=False Positive

<sup>f</sup> ND = Not Detectable

<sup>g</sup> Expected Result Based on Calibrator Concentration

TABLE 7  
COMPARISON OF D TECH PCB test kit WITH GC - TRIAL #1

SAMPLE	D TECH (ppm)	GC (ppm)	AGREEMENT Y, FN, FP
J1	4.0-15	5.0	Y
J2	>50	147	Y
J3	15-50	54	Y
J5	15-50	160	FN
J6	>50	1200	Y
J7	4.0-15	12	Y
J8	4.0-15	28	FN
J9	>50	463	Y
J10	>50	1760	Y
J11	>50	28	FP
J12	15-50	17	Y
J13	>50	1300	Y
J14	>50	186	Y
J15	15-50	31	Y
J16	15-50	36	Y
J17	>50	31	FP
J18	>50	130	Y
J19	>50	1310	Y
J20	>50	2620	Y
J21	>50	11100	Y
J22	1.0	0.01	FP
J23	1.0	0.60	Y
J24	<0.5	0.10	Y

SAMPLE	D TECH (ppm)	GC (ppm)	AGREEMENT Y, FN, FP
J25	0.5	0.12	FP
J26	<0.5	0.01	Y
J28	1.0	1.8	Y
J28	<0.5	0.18	Y
J29	0.5	0.54	Y
J30	>50	21	FP
J31	4.0-15	13	Y
J32	0.5	0.72	Y
J33	0.5	0.32	Y
J34	1.0	0.36	FP
J35	1.0	0.26	FP
J36	>50	70	Y
J37	<0.5	0.12	Y
J38	0.5	0.81	Y
J39	0.5	0.33	Y
J40	<0.5	0.19	Y
J41	<0.5	0.01	Y
J42	1.0	0.43	FP
J43	1.0	0.31	FP
J44	15-50	503.4	FN
J45	15-50	5.6	FP
J46	<0.5	0.02	Y
J47	<0.5	0.22	Y

<sup>b</sup> Y=Yes, FN=False Negative, FP=False Positive

TABLE 7(cont)  
COMPARISON OF D TECH PCB test kit WITH GC - Trial #3

SAMPLE	D TECH (ppm)	GC (ppm)	AGREEMENT Y, FN, FP
W1A	4.0-15	9.1	Y
W2A	4.0-15	11	Y
W3A	1.0-4.0	2.8	Y
W4A	4.0-15	13	Y
W5A	>50	29	FP
W6A	>50	1200	Y
W7A	>50	57	Y
W8A	4.0-15	18	Y
W9A	1.0-4.0	1.3	Y
W10A	0.5-1.0	0.44	Y
W11A	15-50	120	FN
W12A	15-50	48	Y
W13A	15-50	19	Y
W14A	4.0-15	2.7	Y
W15A	1.0-4.0	1.3	Y
W16A	1.0-4.0	0.3	FP
W17A	4.0-15	1.4	FP
W18A	1.0-4.0	2.2	Y
W19A	4.0-15	8.2	Y
W20A	>50	9.3	FP
W21A	>50	110	Y
W22A	1.0-4.0	0.6	Y
W23A	>50	46	Y

Table 10

## Comparison of PCB RISC™ Liquid Waste Test with Method 8082

Sample ID	Sample Matrix	GC Results		IA Results	
		Aroclor	Conc. ppm	Test Results	Corr. with GC Results
302	Condensate	ND <sup>b</sup>	ND	<5	yes
303	Condensate	ND	ND	<5	yes
304	Condensate	1242	25	≅5	yes
306	Condensate	1242	5	≅5	yes
307	Condensate	1242	<10	<5	yes
308	Condensate	1242	58	≅5	yes
310	Condensate	1254	25	≅5	yes
311	Condensate	1242	200	≅5	yes
331	Transformer Oil	1260	183	≅5	yes
380	Transformer Oil	PCB <sup>c</sup>	20	≅5	yes
381	Transformer Oil	PCB	38	≅5	yes
382	Transformer Oil	PCB	163	≅5	yes
383	Transformer Oil	PCB	176	≅5	yes
384	Transformer Oil	PCB	336	≅5	yes
385	Transformer Oil	PCB	6400	≅5	yes
387	Coolant	PCB	10	≅5	yes
388	2,4-D Rinse Water	1254	<10	<5	yes
389	Waste Solvent	1242	29	≅5	yes
390	Herbicide	ND	<2	<5	yes
391	Paint/Solvent	1254	9	≅5	yes
394	Waste Solvent	1242/1260	11/17	≅5	yes
395	Waste Solvent	1242/1260	2/2	<5	yes
396	Waste Oil	1260	323	≅5	yes
398	Chlor. Solvent	ND	<5	<5	yes
399	Paint	ND	<50	<5	yes
400	Pump Oil	ND	<50	<5	yes
401	Waste Solvent	ND	<35	<5	yes
402	Herbicide	ND	<50	<5	yes
403	Paint/Solvent	ND	<5	<5	yes
404	Printing Solvent	ND	<5	<5	yes

Table 11

Correlation of PCB RISC™ Liquid Waste Test and Method 8082 Results  
Using Spiked and Unspiked Liquid Waste Field Samples

ID	Matrix	GC Results	Immunoassay Result		Interp.
		Unspiked ppm	Unspiked ppm	Spiked (5 ppm 1248)	
001	Aromatic solvent	<5	<5	NS	
002	Aviation gas	<5	<5	NS	
003	Chiller oil	<5	<5	NS	
004	Compressor oil	<5	<5	NS	
005	Coolant + water	<5	<5	NS	
006	Coolant oil	NR <sup>b</sup>	NR	NS	
007	Coolant oil	NR	<5	NS	
008	Cutting oil	<5	<5	NS	
009	Cutting oil	<5	<5	NS	
010	Degreaser still bottom	<5	<5	NS	
011	Dope oil	<5	<5	NS	
012	Draw Lube oil	<5	<5	NS	
013	Fleet crankcase oil	<5	<5	NS	
014	Floor sealer	<5	<5	NS	
015	Fuel oil	<5	<5	NS	
016	Hi-BTU oil	<5	<5	NS	
017	Honing oil	<5	<5	NS	
018	Hydraulic oil	<5	<5	NS	
019	Hydraulic oil	<5	<5	NS	
020	Hydraulic oil	<5	<5	NS	
021	Machine oil	NR	<5	NR	
022	Mineral oil	<5	<5	NS	
023	Mineral spirits	<5	<5	NS	
024	Mineral spirits + ink	<5	NS	NS	FP
025	Mixed flammables	<5	<5	NS	
026	Mixed solvents	<5	<5	NS	
027	Naphtha	<5	<5	NS	

Table 11 (continued)

ID	Matrix	GC Results Unspiked ppm	Immunoassay Result		Interp.
			Unspiked ppm	Spiked (5 ppm 1248)	
056	1,1,1-Trichloroethane	<5	<5	NS	
057	1,1,1-Trichloroethane	<5	<5	NS	
058	1,1,1-Trichloroethane	<5	<5	NS	
059	1,1,1-TCE + methanol	<5	<5	NS	
060	Trichloroethylene	<5	<5	NS	
061	Trichloroethylene	<5	<5	NS	
062	Trichloroethylene	<5	<5	NS	
063	Turpentine	<5	<5	NS	
064	Used n-butylacetate	<5	<5	NS	
065	Used oil + freon	<5	<5	NS	
066	Used oil + freon	<5	<5	NS	
067	Used oils	<5	<5	NS	
068	Used petroleum	<5	<5	NS	
069	Used petroleum	<5	<5	NS	
070	Used synthetic oil	<5	<5	NS	
071	Varnish + stain	<5	<5	NS	
072	Varsol	<5	<5	NS	
073	Waste coolant + oil	<5	<5	NS	
074	Waste ink + solvent	<5	<5	NS	
075	Waste naphtha	<5	<5	NS	
076	Waste oil	<5	<5	NS	
077	Waste oil	<5	<5	NS	
078	Waste oil	<5	<5	NS	
079	Waste oil	<5	<5	NS	
080	Waste oil	<5	<5	NS	
081	Waste oil	<5	<5	NS	
082	Waste oil	<5	<5	NS	

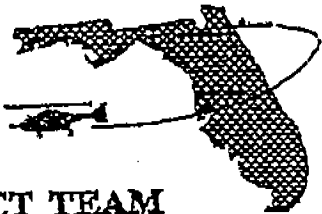
## **APPENDIX H**

### **ABB MEMORANDUM ON PCB CONCENTRATIONS**



Naval  
Station

**MAYPORT**



**PROJECT TEAM**

**MEMORANDUM**

DATE: June 20, 1995

TO: David Driggers, SouthDiv

INFO: Steve Santamaria, Bechtel  
Jay Bassett, EPA  
Jim Cason, FDEP  
Cheryl Mitchell, Mayport  
Srin Kuchibotla, ABB-ES

FROM: Peggy Layne, ABB-ES  
Frank Lesesne, ABB-ES

SUBJECT: PCB Concentrations in soil at PCB area adjacent to SWMU 2

The maximum concentration of PCB in soil detected at the PCB area adjacent to SWMU 2 during RFI sampling events in 1992 and 1994 is 170 mg/kg (ppm) as determined by USEPA Method 8080. These results are summarized in Table 2-1 of ABB-ES' Interim Measures Workplan, SWMU 2 PCB Area, May 1994 (Draft). Copies of laboratory Form Is (or equivalent) from Quality Analytical Laboratory (QAL, formerly CH2MHill Laboratory) for these analyses were provided to Cheryl Mitchell on June 14, 1995.

The value of 1700 ppm reported in the legend of Figures 2-2, 4-1, 4-2, 4-3, and 6-1 of the Interim Measures Workplan is in error.

